EMODnet Thematic Lot n°1 -Bathymetry

EASME/EMFF/2019/1.3.1.9/Lot1/SI2.836043

Start date of the project: 20/12/2020 (24 months)

Centralisation Phase

Quarterly Progress Report (6)

Reporting Period: 01/04/2022 – 30/06/2022

The European Marine Observation and Data Network (EMODnet) is financed by the European Union under Regulation (EU) 2021/1139 of the European Parliament and of the Council of 7 July 2021 establishing the European Maritime, Fisheries and Aquaculture Fund and its predecessor, Regulation (EU) No. 508/2014 of the European Parliament and of the Council of 15 May 2014 on the European Maritime and Fisheries Fund.

Contents

1. Highlights in this quarter

Task 1: Maintain and improve a common method of access to data held in repositories

During the reporting period, the number of survey data sets has increased by new contributions of 6 data providers from 36716 to 40596 CDI entries while the number of Composite DTM entries has increased from 259 to 266. Major new contributions were made by Shom (1489 of which 1487 with CC-BY-4.0) and the Norwegian Hydrographic Service (NHS) with 3947 CDI survey entries around Norway in Arctic, Norwegian, and North Sea (all with CC-BY-4.0), while replacing 1233 earlier CDIs. At the same time, OceanWise de-activated 404 earlier CDI records due to duplicates. The data population phase is now finished for the current contract, because the data sets are being used as input for updating and generating the new versions of the Regional DTMs for which activities have started early 2022. Some more contributions are expected from OceanWise (new UKHO surveys) and NHS, whereby 42 of the 43 agreed data providers have now fully fulfilled their population activities. Data providers have also started with preparing and populating into Sextant additional HR-DTMs. These will be processed in a later stage of the project by the Integrator and then included in the updated HR-DTM layer as part of the planned 2022 release of EMODnet DTM.

Task 2: Construct products from one or more data sources that provide users with information about the distribution and quality of parameters in time and space

Regional coordinators are making considerable progress in their work related to the bathymetric data sets aggregation and generation of the updated Regional DTMs. During this phase, a detailed work has been performed of evaluation and selection of the most relevant/usefull datasets to be used for updating existing areas or for covering gaps in the current Regional DTMs. This is a tedious process involving both the experience of the regional coordinators and making use of special functions included in the Globe software enabling dedicated analysis and visualisation. During the period, regional coordinators have benefited from two project meetings (5/5/2022 and 5/07/2022) during which progress status was given along with time allocated for discussion on the use of Globe, or for solving technical issues. The regional coordinators have been given end of July 2022 as a deadline for finalising their work on the new data integration and generating an updated version of their Regional DTMs, which then will be shared with the overall integrator GGSGC for composing the new 2022 release of the EMODnet DTM. The current status for the different regional coordination zones is as follows:

Greater North Sea region	BSH (Germany)	Final steps. Validation of the product. Awaiting one more contribution.
Celtic Seas region	NOC (UK)	Final steps. Validation of the product. Awaiting one more contribution
Iberian Coast – North East Atlantic Ocean north of Equator	IPMA (Portugal)	Final steps. Validation of the product.
Macaronesia region	IHPT (IHPT)	Final steps. Validation of the product.

Channel – North East Atlantic Ocean – Bay of Biscay region	Shom (France)	Final steps. Validation of the product. Awaiting one more contribution.
Baltic Sea region	SMA (Sweden)	Provided for integration.
Norwegian - Icelandic Sea region	GRID Arendal (Norway)	Underway with processing.
Western Mediterranean Sea region	IFREMER (France)	Provided for integration.
Adriatic - Ionian Sea region – Central Mediterranean	CNR-ISMAR (Italy)	Final steps. Validation of the product.
Eastern Mediterranean Sea region	HCMR (Greece)	Final steps. Validation of the product.
Black Sea Sea region	IFREMER (France)	Provided for integration.
European Arctic waters and Barents Sea	SU (Sweden)	Underway with processing.
Caribbean seas	Ifremer and Shom (France)	Underway with processing.

Table: Status of updating of Regional DTMs

Partner GGSGc, in charge of the integration, has started the process of validation of the contributions already received from regional coordinators. One part of the integration process will be to include a LAT-MSL correction as the Regional DTMs are generated relative to the LAT vertical level. The final EMODnet DTM will also be delivered relative to MSL. This correction is derived from the Global Tide and Surge Model (GTSM) as developed and operated by partner Deltares. The developments for GTSM v4.1 have been finalized, which resulted in a considerably improved accuracy in Europe. A description of the calibration has been published in Wang et al 2022 (https://os.copernicus.org/articles/18/881/2022/). Currently, the computation of an updated LAT-MSL field is ongoing for the EMODnet Bathymetry geographical area.

GTSM model outputs are also used for processing satellite derived inter-tidal bathymetry and for computation of the satellite derived coastlines. In the process of building a release for the EMODnet DTM a land-sea mask is applied. This is important for the interpolation and extrapolation of the available bathymetry data, since surveys often do no fully extend until the high-water coastline and because in many places there is a steep increase of the height just landward of the high-water coastline (due to levees, dunes, seawalls, cliffs etc.) The mask for the 2020 release is based on the Open Street Map coastline, which is very good in many places, but can result in artefacts in some places. This can for example result in a small gap of beach without values, as in the following example.

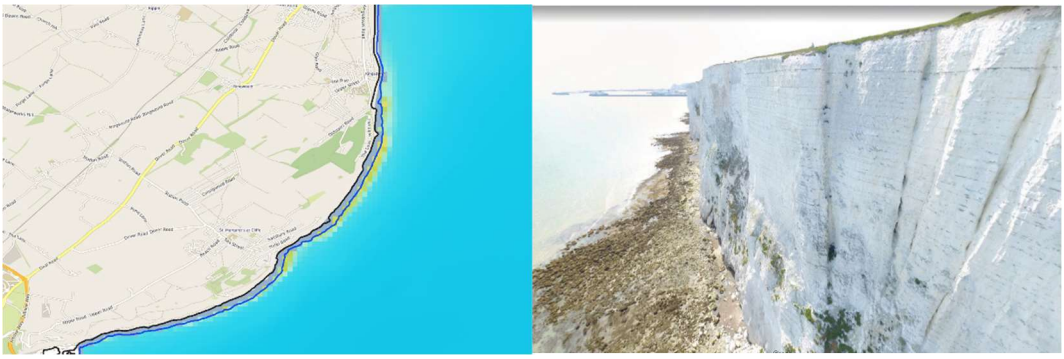

Image: Satellite derived coastline near Dover (left, high-water in black and low-water in blue) and a photograph of the same location (right, source google-streetview)

Extending the data onto the beach is not trivial, since the inclusion of height values at the top of the cliff, would result in much too high values. For this, a new approach is developed where the satellite derived coastline is used to build the land-sea mask. At the same time the high-water height is assigned to the grid-cells that fall on the gridded high-water coastline. This avoids including top-of-cliff values in the interpolation. Modelled HAT-LAT values from GTSM are used for the heights. In the first half of 2022, the proposed method has been worked out in detail and tested for a number of different cases. During the summer, it is planned to discuss if it is realistic to include the new approach already in the oncoming 2022 release of the EMODnet gridded bathymetry.

The Best Estimate Satellite Derived Digital Coastlines are to be extended to the Caribbean, for which the same geographical area was selected as being used for the Caribbean Regional DTM. Within the project the data will be processed in 1°x1° tiles for the area shown in the figure below. Since the area for the most part has quite clear water and fewer clouds than the main continent, the NDWI index for optical Sentinel-2 images is expected to perform well. The new region has been divided in tiles to produce satellite derived coastlines. The computation is currently running in the cloud.

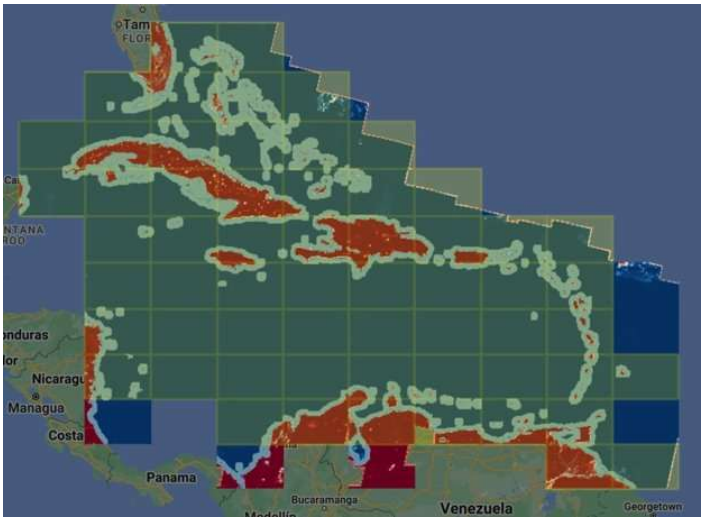

Image: Tiles used for production of satellite derived coastline for Caribbean

Another activity is to update and further complete the overview of official coastlines and legal baselines for all countries around Europe, led by Deltares and Shom. More specifically, the aim is to update the existing inventory of existing and ratified baselines, registered claims / disputes under UNCLOS, for European countries, and official national coastlines. For this, all relevant partners have been contacted about updates and extensions of the coastlines and most have responded. Follow up discussions are ongoing with some. New data received has been processed and included into the collection. An update of the report on coastlines and baselines is ongoing. A draft will be sent to the partners for review during the summer period. The table below gives an overview of progress.

Nr	Country	Baseline	Coastline
1	Albania	N/A	N/A
2	Belgium	Available	Available
3	Bulgaria	N/A	Available
4	Croatia	**Available**	Available
5	Cyprus	N/A	N/A
6	Denmark	Available	Available
7	**Estonia**	**Available**	**Available**
8	Finland	N/A	N/A
9	France	Available	Available
10	Georgia	N/A	N/A
11	Germany	Available	Available
12	Greece	Available	Available
13	**Iceland**	**Available**	**Available**
14	Ireland	Available	Available
15	**Israel**	**Available**	Available
16	Italy	Available	Available
17	Latvia	Available	Available
18	Lithuania	N/A	N/A
19	Malta	Available	Available
20	Monaco	N/A	N/A
21	Montenegro	N/A	N/A
22	Netherlands	Available	Available
23	Norway	Available	Available
24	**Poland**	**Available**	**Available**
25	Portugal	Available	Available
26	Romania	Available	Available
27	Russia	N/A	N/A

Table: List of available and updated (bold) coastline data

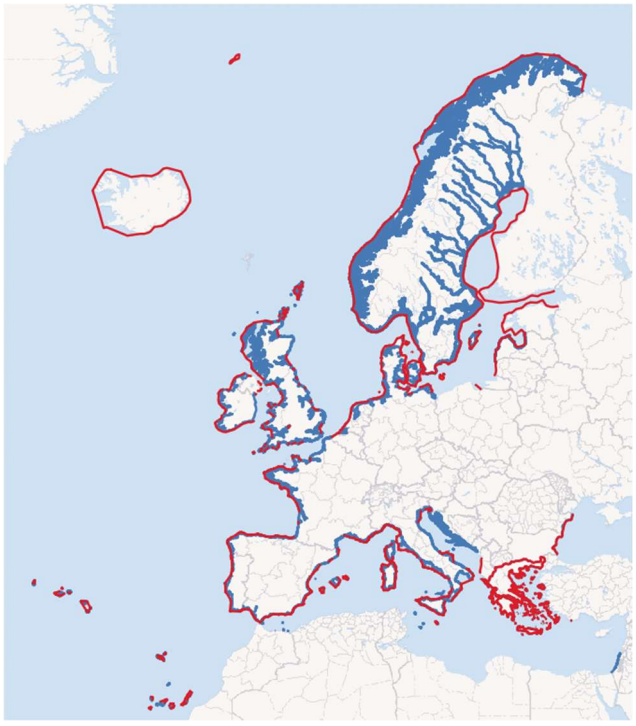

Image: Official coastlines and baselines around Europe.

A final activity is to establish tidal bathymetry for the Venice Lagoon, led by Deltares and CNR-ISMAR. At the moment, the EMODnet DTM does not include Venice lagoon. One of the reasons is that the coastline excludes the lagoon, which is related to the inconsistencies between coastline and bathymetry mask discussed above. As a consequence, there are also no LAT values available. The activity aims at including available bathymetry, extending the LAT computation to include the lagoon and adding satellite derived bathymetry. A second goal is to show the impact of bathymetry on hydrodynamic modeling for the very relevant storm surges in Venice. In the past year, existing bathymetry has been collected. Outside Venice lagoon, there is already good coverage in the EMODnet DTM. In the lagoon, there is a high-resolution bathymetry available for the channels. This dataset is also available on the EMODnet portal. In addition, CNR-ISMAR has kindly made available a gridded high-resolution bathymetry for the Venice lagoon. Deltares has computed the Water Index, as a first step towards computing the intertidal bathymetry for the lagoon. And created a regional tide and storm surge model for the Adriatic that will be used to compute sealevels for the processing of satellite derived bathymetry in the region and also for the impact study on the value of high-resolution coastal bathymetry. Tide-gauge measurements for the region have been collected and checked. The regional numerical model has been

finalized and compared to measured sealevels. The accuracy of the tides is around 3cm (std) around Venice and more accurate elsewhere. The computed frequency distributions for the sealevels in the lagoon are necessary to link drying and flooding frequencies from Sentinel-2 to heights, which is the next activity to undertake.

Task 3 - Develop procedures for machine-to-machine connections to data and data products

There is regular contact between the EMODnet Central Portal team (CP team) and a technical team from EMODnet Bathymetry since early January 2021 to discuss and monitor progress of the migration process. This is support by actions on JIRA. In the reporting period two more meetings took place between the Central Portal and EMODnet Bathymetry technical teams. In the period, EMODnet Bathymetry has undertaken several actions of relevance for the migration, of which a few are highlighted below:

- CP team has implemented the agreed narrative for the EMODnet Bathymetry section on the CP. This has been reviewed and edited by the Bathymetry team. For now, it seems ok, while Bathymetry team plans a final review when also all services are connected and possibly supply some illustrations to make it more attractive;
- Following a further request of the CP team, the Bathymetry team has prepared another excel overview with all expected layers for the Central Map viewer, their correct metadata descriptions (now all supported by Sextant Catalogue entries), associated web services, expected functionalities, and a review of the outstanding issues, both for CP team and Bathymetry team. Both teams have followed up actions, and the Central Map viewer in test has made further progress. However, there are still layers missing or functionalities missing / incomplete which requires further actions from CP team.
- Downloading of all DTM tile files (144) and HR-DTM files (currently 245) is foreseen at the CP by a Central Products Catalogue service. Bathymetry team made good progress with arranging another Sextant service deployment which brings together all metadata entries for these DTM products, so that these can be regularly harvested by means of CSW. Moreover, the Bathymetry team is well underway with providing each of these entries with direct download links, which point to data sets that are hosted at EMODnet Bathymetry.
- However, there is still discussion ongoing how to arrange that downloading of the DTM tiles and HR-DTMs can also be done from the Central Map viewer and then not only by ERDDAP as that has no shopping basket functionalty. The latter is essential as EMODnet Bathymetry is serving many professional users who want to download multiple DTM tiles and/or HR-DTM files in an efficient way as they will use these for loading their own GIS applications. Currently, EMODnet Bathymetry is serving each quarter circa 10.000 of such bathymetry files, which level should be continued also after migration. Just using the ERDDAP function of drawing a polygon and download the associated data set is fine for casual queries but not for systematic downloading. This needs to be solved in order not to downgrade the success of EMODnet Bathymetry.

Another activity under Task 3 is the uptake of the online Collaborative Virtual Environment (CVE). The latest version of the CVE tool allows visualising the differences between the current EMODnet 2020 and the new aggregation that regional coordinators are making. Differences can be visualised as a residual grid, which allows to highlight grid improvement, but also artefacts, such as anomalies and outliers, which need to be solved. The CVE is already used by regional coordinators of the Mediterrannean area. Next step is to generalise this by adding other regional basin DTMs.

Task 4 - Contribute data, data products and content to a central portal that allows users to find, view and download data and data products

This is related to updating the Central Portal with the new products, which are planned as part of the new contract. The updating will take place once the migration activities as described above under Task 3 have been fulfilled and finalised. Once operational, there will be an update with every new release of the EMODnet DTM and its HR-DTMs, which currently happens each 2 years.

Task 5 - Contributing content to dedicated spaces in Central Portal

This is related to updating the narrative pages of EMODnet Bathymetry at the Central Portal. The updating will take place once the migration activities as described above under Task 3 have been fulfilled and finalised. Once operational, there might be regular updates.

Task 6 - Ensure the involvement of regional sea conventions

Secretariats of the Regional Sea Conventions are kept up-to-date of the EMODnet Bathymetry services, inter alia through regional partners. On a global scale, good synergy is continued with GEBCO and the Seabed 2030 project. In this context, George Spoelstra (GGSgc) and Federica Foglini (CNR), both members of the EMODnet Bathhymetry consortium, as Chair and Vice-Chair of the GEBCO subcommittee TSCOM (Technical Subcommittee on Ocean Mapping) participated to a meeting of the Guiding Committee of GEBCO which took place 20 – 22 April 2022 in Monaco at IHO. They are making progress with promoting adoption of the metadata – data management practices, i.c. SeaDataNet CDI standards and services, as applied by EMODnet Bathymetry.

Task 7: Contribute to the implementation of EU legislation and broader initiatives for open data:

During this current quarter, the 10th anniversary of the Memorandum of Understanding (MOU) signed between the European Commission and the International Hydrographic Organization (IHO) has been celebrated. Senior representatives including EC Commissioner for environment, oceans and fisheries, Virginijus Sinkevičius and Director Luigi Sinapi from IHO both commented on the mutual synergies between both communities in their role of implementing EU legislation and IHO standards, INSPIRE or S-100 standards being respectively two examples. Numerous comments from the assembly described EMODnet Bathymetry (and its associated ecosystem such as SeaDataNet or other thematic portals) as a flagship of the last decade both at the European level and at the international level through its relation with the GEBCO / Seabed 2030 project. The MOU has been renewed for another decade.

Task 8 - Monitor quality / performance and deal with user feedback

The overall performance of the portal and its services is continuously measured and its results are reported in the separate indicators spreadsheet. It demonstrates that the Bathymetry portal and its services and products continue to be highly popular and in great demand for a wide range of user applications. Also, several user feedback questions were received and answered by the helpdesk. The user questions received and answered are detailed in chapter 3 and Annex 1.

Task 9 - Maintain the existing thematic web portal for a maximum of six months from the start of the project

The current EMODnet Bathymetry portal is maintained (and used as focal point for Bathymetry users) until agreement is reached between EMODnet Bathymetry team, CP team, CINEA and DG MARE that the level of service of the new Central Portal has reached a similar standard as the EMODnet Bathymetry portal.

Project management

The coordinator and technical coordinator have prepared the 5th quarterly progress report for the new contract which was accepted by EU (CINEA and DG MARE). Likewise, the interim report has been generated and also

accepted. Moreover, they have arranged several project meetings to discuss and monitoring progress of all Tasks and related Work Packages.

Status of the Milestones and Deliverables listed in the workplan					
Milestone/Deliverable in numerical order	WP	Date due	Status (To do/ Delivered/ Delayed)	Date delivered	If Delayed: reason for delay and expected delivery date
D1.1: Quarterly concise progress reports	WP1	M4, M7, M10, M13, M16, M19, M24,	Delivered	M4, M7, M10, M13 and M16	
D1.2: Annual Interim report	WP1	M12	Delivered	M14	
D1.3: Final report	WP1	M24	To do		
D1.4: Plan for service continuity, incl. docs and sources	WP1	M24	To do		
D2.1: Upgraded guidelines for data pre-processing and population of metadata	WP2	M3	Delivered	M4	
D2.2i: Training Workshop for data pre-processing and metadata population	WP2	M3	Delivered	M4	
D2.3: Pre-processed survey data sets and included in CDI Service	WP2	M12	Delivered	M15	
D2.4: Pre-processed composite DTMs and included in Sextant service	WP2	M12	Delivered	M12	
D2.5: Satellite Derived Bathymetry data sets and included in Sextant Service	WP2	M12	Delivered	M12	
D3.1: Upgraded guideline of EMODnet methodology for DTM production, including using prototype CVE	WP3	M8	Delivered	M12	

D3.2i: Upgraded Globe software	WP3	M8	Delivered	M9	The software is continuously maintained and upgraded
D3.3i: Training and intercalibration Workshop	WP3	M11	Delivered	M11	
D3.4i: Processed and pre-gridded data sets as input for RDTMs	WP3	M14	Well underway		See above for details on the status
D3.5i: Regional DTMs with common resolution of 1/16 arc minutes grid	WP3	M17	Well underway		See above for details on the status
D3.6i: Best version HR DTMs for coastal waters and hotspots	WP3	M20	Underway		
D3.7: New EMODnet DTM incl Quality Index and loaded in EMODnet web services for viewing and downloading	WP3	M23	To do		
D3.8: HR-DTMs loaded as separate layer in EMODnet web services for viewing and downloading	WP3	M23	To do		
D3.9: Source reference layer to link to CDI and Sextant Catalogue services	WP3	M23	To do		
D3.10: Refined best-estimate European digital coastlines for a range of vertical levels at the portal	WP3	M22	Underway		See above for details on the status
D3.11: Updated Inventory of existing and ratified baselines and registered claims / disputes under UNCLOS, for European countries at the portal	WP3	M20	Underway		See above for details on the status

D3.12: Tidal bathymetry for Venice Lagoon	WP3	M23	Underway		See above for details on the status
D4.1: Standard machine- to-machine services delivered for common functionalities	WP4	M3	Delivered	M1	See above for details on the status
D4.2: Dedicated machine- to-machine services adapted / delivered for special functionalities	WP4	M6	Delivered	M6	See above for details on the status
D4.3i: CVE adapted for handling review of RDTMs	WP4	M14	Done	M14	Contributions from Regional coordinators are also fed to the CVE system
D4.4i: Globe software + GGSGC workbench upgraded with extra functionality	WP4	When required	Done		Globe Software is continuously maintained and upgraded
D5.1: Operational Help-desk	WP5	continuously	Underway		
D5.2: Monitoring data about visits and usage	WP5	continuously	Underway		
D5.3: Promotional material and up-to-date thematic space at central portal	WP5	continuously	Underway		
D5.4: Presentations at relevant conferences	WP5	Regularly	Underway		

2. Identified issues: status and actions taken

A. Priority issue(s) identified and communicated by CINEA/ DG MARE/ SECRETARIAT				
Priority issue	Status (Pending/ Resolved)	Action(s) taken/ remaining actions planned	Date due	Date resolved
EM487 - Metadata: survey tracks/polygons layer	Partly Resolved; awaiting follow-up	Provided to CP Team a document with detailed specifications of two of the EMODnet Bathymetry map layers (source references AND survey tracks/polygons) and their advanced services AND the results of testing their current implementation in the new test CP mapviewer. No further feedback received. Somehow **Source Reference layer** is no longer present in the CP Test Map Viewer service, which should be recovered.		
EM188 - Adding the URL to the metadata as an attribute field in the Bathymetry Source reference layer	Pending	Discussion between CP team and Bathymetry Team about how to connect from Source Reference layer to CDI and Sextant services. See also EM487. Bathy explained how it works and why to work with EDMO and codes and not prefilled and very many URLs to stay more flexible and performing in URLs. No further feedback received. Somehow **Source Reference layer** is no longer present in the CP Test Map Viewer service, which should be recovered.		
EM390 – Bathymetry review of the new CP Map viewer	Pending	Again, explained how to solve the same issues as in EM487 and EM188, but		

		with other contacts of CP team. No further feedback received. **Source Reference layer** is no longer present in the CP Test Map Viewer service, which needs to be recovered.		
EM-563 Feedback on CP Main Menu	pending	Some feedback delivered about Product Catalogue missing search by Thematics. Further feedback planned later as we are focusing on Bathymetry first and not overall CP.		
EM511 – Create single bathymetry NetCDF file from 64x tiles (2020 DTM)	Resolved	Has been solved in dialogue between CP team and Bathymetry team.		April 2022
EM527 – Bathymetry – EMODnet Catalogue Tags	Pending			
EM-294 Dashboard issue with Helpdesk page views	Resolved	Checked that Grafana no longer gives unrealistic web stats for helpdesk visits		17/10/2021

B. Issues / challenges identified by the thematic assembly group itself				
Priority issue / challenge	Status (Pending/ Resolved)	Action(s) taken / remaining actions planned	Date due	Date resolved
Adding shopping basket functionality to CP Map Viewer for guaranteeing good service for downloading multiple DTM tiles and HR-DTM files in different formats by professional users	Pending	Has been discussed several times in CP team – Bathymetry team meetings, but no follow up yet. Instrumental for continuation of success of EMODnet Bathymetry in serving its users.	ASAP	

3. User feedback

Overview of user feedback and/or requests received in this quarter							
Date	Organisation	Type of user feedback (e.g. technical, case study, etc.) and short description of the feedback received	Means of contact	Response time	Status of user query (Resolved/ Pending)	Measures taken to resolve the query	Status: if not (yet) resolved/ pending, explain reason why and expected timeline
14 April 2022	Design Academy Eindhoven, Netherlands	Interest to use bathymetry in 3D for design purposes	Email feedback form	4 Days later because of checking solutions.	Resolved	Provided several suggestions for using the DTM bathymetry in 3D software tools	
13 April 2022	TU Delft, Netherlands	Lost an order.	Email feedback form	Few days later	Resolved	Check order registry and asked to try again.	
4 May 2022	UGent, Belgium	Asked about how to download.	Email feedback form	Few days later	Resolved	Downloading options explained.	
18 May 2022	BGR, Germany	Had problems in depicting WMS layers over 3D viewer	Email feedback form	Several emails back and forth over 2 weeks	Resolved	Explained that it is due to WMS having http while 3D viewer expects https requests.	
18 May 2022	GEUS, Denmark	Request from EMODnet Geology about a WMS service for draping	Email feedback form	Several emails back and forth over 2 weeks	Resolved	Solution found by combining WMS service with grayscale	

		geology data on top of the bathymetry matrix.				functionality of GeoServer .	
18 May 2022	ISPRA, Italy	Asked how to download Bathymetry for Mediterranean Sea	Email feedback form	Same day	Resolved	Explained how to make use of DTM tiles and shopping basket	
19 May 2022	TUM, Germany	Wants to use HR-DTM files and looking for fast way for downloading.	Email feedback form	2 weeks later in order to check options	Resolved	Explained how to make use of the WMTS service with some extra scripting.	
3 June 2022	UNIBO, Italy	Question about LAT – MSL in Venice region	Email feedback form	10 days later to check response.	Resolved	Explained how MSL-LAT correction is computed and locally correct.	
30 June 2022	6Alpha, UK	Problem with WCS service	Email feedback form	Same day	Resolved	Was short out-of-memory glitch.	

4. Meetings/events held/attended & planned

A. Meetings/events organised and attended in the quarter					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
5 Apr 2022	VTC	Meeting with Central Portal team about migration. to discuss progress and actions	No	A	To discuss progress and formulate mutual actions
8 Apr 2022	VTC	EMODnet meet and greet - Bathymetry	Yes	A	To present EMODnet Bathymetry main activities and objectives to new Deputy Head of DG MARE A1 Unit
14 Apr 2022	VTC	Hydrographic Society of Benelux	**Yes**	A	To present EMODnet current status and future objectives
20-22 Apr 2022	Monaco	GEBCO Guiding Committee meeting	**No**	A	Participation by 2 members of EMODnet Bathymetry, promoting adoption of its approach to metadata and data management.
26-27 Apr 2022	VTC/Ostende (Belgium)	EMODnet TWG and SC meetings	**Yes**	A	To update on recent progress on centralisation and thematic work towards next products release
5 May 2022	VTC	EMODnet Regional Coordinators meeting	**Yes**	O	To discuss approach for RDTMs, new GLOBE functions, and planning RDTMs.

06 May 2022	Bruxelles (Belgium)	IHO – Europe Commission 10 years anniversary	**Yes**	A	Share the results gained from the relation established through the MOU signed between the IHO and the European Commission. Renew the MOU.
11 May 2022	VTC	EU Marine Data Services for the All-Atlantic webinar	**Yes**	A	Acting as a panellist, discussing marine data services and synergies between EMODnet and Copernicus
24 May 2022	VTC	Dialogue with NHS to discuss CDI – Data population	**No**	O	Including NHS, Shom, MARIS, SMA, GRID, and GGSGC to discuss best approach for NHS.
1 June 2022	VTC	Meeting with Central Portal team about migration. to discuss progress and actions	No	A	To discuss progress and formulate mutual actions
20 June 2022	VTC	Training session by EU about CP maintenance	No	A	Participation by Shom and MARIS to learn about how to maintain the portal and own bathy section.
				Total # of meetings organised = 2	
				Total # of meetings attended = 9	

B. Meetings/events planned in the future				
Date	Location	Type event (meeting, training (workshop), etc.)	Meeting to be attended (A) / organised (O)	Short description and main expected outcomes
5 July 2022	VTC	EMODnet Regional Coordinators meeting	O	To discuss and monitor progress with production of RDTMs.
6 July 2022	Brest	Décénie des sciences des oceans (UNESCO COI)	A	
18 July 2022	VTC	EMODnet progress meeting: Centralisation state of play	A	

5. Communication assets

A. Communication products developed				
Date	Communication material	Short description (of the material, title, …) of the asset	Main results	Name of event at which material was disseminated (if applicable)

B. Planned communication products			
Date	Communication material	Short description (of the material, title, …) and/or link to the asset	Main results expected

A. (Co-)Authored peer-reviewed publications in the quarter					
Date of publication	Type of publication	Full reference	ISBN	DOI	Is it open access? Yes/No

B. Other/non-peer reviewed types of publications (co-)authored in the quarter					
Date of publication	Type of publication	Full reference	ISBN	DOI	Is it open access? Yes/No

For a compressive overview of publications referring to/making use of EMODnet data and/or data products, please consult Google Scholar.

6. Monitoring indicators

Comments on the progress indicators in the indicators spreadsheet		
Progress indicator	Means of collecting figures	Comment
1. Current status and coverage of total available thematic data A) Volume and coverage of available data	CDI catalogue service	There is a substantial increase of CDIs. In particular more than 2700 of these are originating from the Norwegian Hydrographic Service and more than 1400 from Shom.
What is your opinion on the data coverage within EMODnet for your thematic?	Sea regions in CDI service have been reformulated to follow latest EEA regional polygons. Was considerable effort but now in place.	Data are available for all European regions including the new Caribbean region.
B) Usage of data in this quarter	CDI RSM shopping ledger service	There is a considerable decrease in number of downloaded CDIs compared to previous quarter. However, that quarter was exceptional. Number of users went down
2. Current status and coverage of total number of data products A) Volume and coverage of available data products	Viewing and Download service and Sextant CPRD catalogue service Shopping module and analytics reporter of the Viewing and Download service	Number of products increased with 7 new CDTMs as regional coordinators are underway with production of new Regional DTM releases. The cataloguing of new HR-DTMs has started, but will be published as part of the new 2022 EMODnet DTM release
B) Usage of data products in this quarter	Shopping module and analytics reporter of the Viewing and Download service CDI catalogue service	Again, a very large volume of downloads, both in numbers (> 10000) as in volume (> 1.2 TerraByte). Most numbers are quite the same as previous quarter. Only, this quarter there is 40% more HR-DTMs downloaded. Also, the number of WMS and WFS requests are almos the same as previous quarter.

3. Internal and external organisations supplying/approached to supply data and data products within this quarter	CDI catalogue service	There is again a substantial increase of CDI population by several data providers, in particular by NHS (Norway) and Shom (France), while OceanWise took out a lot of CDIs due to data errors.
4. Online 'Web' interfaces to access or view data	N.A.	No changes
5. Statistics on information volunteered through download forms	CDI RSM shopping ledger service and shopping module and analytics reporter of the Viewing and Download service	Bathymetry is used by all sectors and for many applications as it provides basis information. A lot of users do not give details about themselves, unless they use Marine-ID in the download forms.
6. Published use cases	Matomo	EMODnet Bathymetry has a steady number of use cases which almost all received attention from users. This quarter the stats are quite higher than in other quarters.
8.1. Technical monitoring	Matomo – Grafana	The portal has a very good and stable response time and overall 100% up time.
9. Visibility & Analytics for web pages	Matomo – Grafana	Problem with Grafana showing only Quarterly average and not values in time. Anyway, as expected and targeted, the pages related to the "EMODnet bathymetry viewing and Download Service" have the highest score. This means that users spent the most time browsing and interacting with the viewing service which has many functions and overall is the most interesting product and service that EMODnet Bathymetry has to offer. As second interest, users undertake downloading of DTM tiles and visit the CDI service for details and downloading of survey data sets, which both have a comparable user interest level. The section on web services and standards also is well visited.
10. Visibility & Analytics for web sections	Matomo – Grafana	Problem with Grafana showing only Quarterly average and not values in time. Anyway,This indicator shows the interest of users for specific sections of the website,
11. Average visit duration for web pages	Matomo – Grafana	Problem with Grafana showing only Quarterly average and not values in time. Without this, interpretation is not really possible.

The monitoring numbers reported as part of the progress monitoring of EMODnet performance are collected through Matomo and/or Europa Analytics, unless reported otherwise.

7. Annex: Other documentation attached

Feedback Questions and Answers:

Subject: Re: EMODnet Bathymetry Feedback form
Date: Tue, 19 Apr 2022 09:21:32 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To:

Dear ….,
Great that you are interested in using EMODnet Bathymetry data for your work. I checked with one of our technicians and he gave the following advice:
All bathymetric data of the EMODnet area of interest (greater Europe) is available for download through our data viewer. We have different formats available. I don't know what software you use to create your work so I can't advice you on which format would suit you best. But to give you a bit of direction, there is QGIS and the plugin called DEMto3D. This plugin can take DEM/DTM/DSM's and turn them into a STL file, one of several file types that can be used in 3D printing. This plugin is straight forward to use, and it is one of the first tools that links GIS data and 3D printing. DEMto3D allows one to export DEM to STL format to make GIS data ready for 3D printing.
QGIS is open source and free to download and use.
Let us know if this works for you and last but not least we are very interested in what you will create. Would it be possible to keep us up to date with your work.
Kind regards
Dick M.A. Schaap
Technical Coordinator
On 4/14/2022 7:04 PM, noreply@maris.nl wrote:

Name	
Email	
Feedback / Question	Good evening, my name is …, I am an artist, currently finishing a masters program at Design Academy Eindhoven. I am making a project about the shapes of the seafloor in different areas of the world. I noticed the North Sea bathymetry reveals an amazing shape, and I was wondering If there is already a 3d model of the North Sea bathymetry which I could use for my project. Thank you for your time Kind regards

---

Subject: Re: EMODnet Bathymetry Feedback form
Date: Tue, 19 Apr 2022 09:18:28 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To:

Dear ..,
Thanks for your interest in EMODnet Bathymetry.
We have checked our logs, but can find only one order from you:
Requested Expired
22-2-2022 10:26:15 22-2-2022 22:26:15
So it seems your new order did not come through.
Could you try again?
Kind regards
Dick M.A. Schaap
Technical Coordinator

On 4/13/2022 10:24 AM, noreply@maris.nl wrote:

Name	
Email	
Feedback / Question	Hi! I requested some bathymetry .nc files yesterday and I still haven't received any email with download links. It's the first time it takes so long. I was wondering if there are any delays or technical issues with the service?

Subject: EMODnet Bathymetry Feedback form
Date: Mon, 9 May 2022 10:21:35 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To:

Dear …,
Thank you for your interest in EMODnet Bathymetry.
For downloading of larger files we recommend to make use of the DOWNLOADS option of the Bathymetry Viewing and Downloading service at:
https://portal.emodnet-bathymetry.eu
This facilitates to download the EMODnet DTM in tiles of circa 1 GB each and in several formats.
Read the HELP section to get a good understanding:
https://portal.emodnet-bathymetry.eu/help/help.html
Kind regards
Dick M.A. Schaap
Technical Coordinator

On 5/4/2022 4:57 PM, noreply@maris.nl wrote:

Name:	
Emailaddress:	
Feedback:	Dear, I would need to get bath data for the following grid: lon = [-2, 7]°E and lat = [51-55]°N. The downloader tells me the file is to big. Is there a way to get this data. Should i split the grid into 4 and download 4 different files? What is the resolution of the data? I will use it for science, and refer to your product in the references. thx,

---

Subject: EMODnet Bathymetry Feedback form
Date: Fri, 10 Jun 2022 13:15:21 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To:
CC:

Dear .. ,
It really seems to be a http - https issue. Although your provided url is https, your get capabilities provides a http end point. (see below)
Kind regards
Dick
On 6/9/2022 2:44 PM, … wrote:
Dear Dick
Thanks for the reply. Below you may find the link to the WMS which I was trying to include in the web map portal of the EMODnet bathymetry.
https://drive.emodnet-geology.eu/geoserver/bgr/wms

It seems as if the link / service would meet the requirements but unfortunately, the map layer does not show up in the 3-D-View.
But it is visible on the 2-D-View.
Best regards

Von: Dick M.A. Schaap <dick@maris.nl>
Gesendet: Donnerstag, 9. Juni 2022 12:00
An:
Betreff: EMODnet Bathymetry Feedback form
Dear ..,
Thank you for your interest in EMODnet Bathymetry.
Sorry for not responding directly by I needed some discussion with colleagues.
The issue, you are experiencing, might have to do with HTTP vs HTTPS.
The portal uses HTTPS. Most probably your WMS endpoint uses HTTP. Normally, it is not allowed within HTTPS context to execute unsecure HTTP requests. However, there is an exception for images, by which the WMS is visible in the 2D viewer. However, in the 3D viewer, the images are retrieved in a differrent manner, which requires HTTPS.
Hope this gives an explanation.
Kind regards,
Dick M.A. Schaap
Technical Coordinator
On 5/18/2022 2:05 PM, noreply@maris.nl wrote:

Name:	
Emailaddress:	
Feedback:	Hello, I try to add additional WMS-based layers to the 3D-view. They do not appear, even though they are added and visible in 2D-view. Anyway, it is a great map portal! thanks

---

Subject:EMODnet Bathymetry Feedback form
Date: Tue, 14 Jun 2022 10:32:56 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To:
CC:

Dear …. ,
My colleague George Spoelstra proposes the following:
What you could try is the use the capabilities of GeoServer. You can actually specify a grayscale yourself by calling GeoServer. Below is an example that does this:

https://ows.emodnet-bathymetry.eu/wms?SERVICE=WMS&VERSION=1.3.0&REQUEST=GetMap&FORMAT=image%2Fpng&TRANSPARENT=true&STYLES=my_custom_style&LAYERS=emodnet%3Amean&exceptions=application%2Fvnd.ogc.se_inimage&CRS=EPSG%3A4326&WIDTH=1200&HEIGHT=800&BBOX=47.021484375%2C-19.423828125%2C64.599609375%2C6.943359375&SLD=https://emodnet-bathymetry.s3.eu-central-1.amazonaws.com/20220610/grayscale.sld
You have to define your own grayscale sld. In the example we made one temporarily (example: https://emodnet-bathymetry.s3.eu-central-1.amazonaws.com/20220610/grayscale.sld)
This gives you then full control over the colours. Note that we will not keep the example => you have to define the sld yourselves.
Please have a try and provide us feedback.
Kind regards
Dick

On 6/9/2022 5:14 PM, wrote:
Dear … others,

A grayscale map might be convenient for colour blinded users also. Often they are forgotten.

Just a thought.

Best Regards,

From:

Sent: 09 June 2022 17:20
To: 'Dick M.A. Schaap' <dick@maris.nl>
Cc:
Subject: SV: EMODnet Bathymetry Feedback form

Dear Dick
I now had some time to look into WCS for my scenario.
WCS has two problems:

1. It's difficult (almost impossible) to drape an image (WMS) on top of a WCS response. If both were WMS, it would be an easy 1:1 match – pixel by pixel.
2. WCS isn't scalable at large scales. If retrieving WCS for whole of Europe, it would be 100s of MB whereas a WMS would return a few MB at any scale.

So, I take the liberty to try again: Would it be possible to have an extra styling for bathymetry using a **linear** color ramp? You currently have color ramps "atlas", "rainbow" and "multi color". What about a "grayscale" also?

If a grayscale style isn't possible, I will try the red channel of "atlas" which seems somewhat linear (see enclosed). Please, let me know, if this approach is problematic.

Best wishes

Fra: Dick M.A. Schaap <dick@maris.nl>
Sendt: 9. juni 2022 11:53
Til:

Sub: ODnet Bathymetry Feedback form
Dear ... ,
It took some time to discuss your question with our technicians.
An option is to make use of the OGC WCS service:
https://ows.emodnet-bathymetry.eu/wcs
By using the WCS you can extract a matrix of depths. It is a bit more work as you then have to process that matrix in real time to get it back in your services though.
Another option is to use the non-rendered WMS layer at: https://ows.emodnet-bathymetry.eu/wms
The GetFeatureInfo is capable of retrieving the depth values but that only gives one depth at the time.
We could investigate if GeoServer is capable of serving a 32 bit Tiff as result of a WMS request. Note that if that is doable, it will be restricted in size just as with the area of interest download.
However, it is not completely clear how you want to implement this. Maybe it is wise to organize a short call including George (in CC) to discuss further?
Kind regards
Dick M.A. Schaap
Technical Coordinator

On 5/18/2022 2:47 PM, noreply@maris.nl wrote:

Name	
Email	
Feedback / Question	As data manager in EMODnet Geology we are creating 2½D views of our seabed data at various scales. We would like to extract a matrix of depths from your services at various scales and drape our own data on top of the bathymetry matrix. Your WMS would be an effective solution, if only we could reverse each pixel color to a depth value. Is this possible? Or would you consider adding a WMS layer with this possibility - for example a grayscale layer?

Subject: Re: EMODnet Bathymetry Feedback form
Date: Wed, 18 May 2022 18:48:53 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To:

Dear .. ,
Thanks for your interest in EMODnet Bathymetry. The only way to download the DTM tiles and indicate the right data format is by means of the Bathymetry Viewing and Download service at https://portal.emodnet-bathymetry.eu
This way we also collect interesting KPIs on the use of the services and products.
BTW: the shopping process is quite efficient. Just fill your basket and submit.
Kind regards
Dick M.A. Schaap
Technical Coordinator
On 5/18/2022 5:02 PM, noreply@maris.nl wrote:

Name	
Email	
Feedback / Question	Hello, there is a way to download the emodnet bathymetry tiles for the Mediterranean region via ftp or any other method without use the portal? Thank you in advance, best regards,

---

Subject: Re: EMODnet Bathymetry Feedback form - extra info
Date: Tue, 14 Jun 2022 11:37:36 +0200
From:
To: Dick M.A. Schaap <dick@maris.nl>

Hello dear Dick,
thanks a lot for the information.
I have just a had look how I could acquire the HR data via the WMTS service.
Do you have an example code also for Python? In your link, the examples are written in (I suppose) Javascript.
Thanks a lot and best regards,

On 09.06.22 11:46, Dick M.A. Schaap wrote:
Dear …
I just got some extra information that the HR-DTM layer is available as WMTS service.
However, this requires some programming.
https://tiles.emodnet-bathymetry.eu/v9/{Layer}/{TileMatrixSet}/{TileMatrix}/{TileCol}/{TileRow}.png

Layer: 'hr_bathymetry'

TileMatrixSet: inspire_quad
An example of a WMTS implementation for the Rainbow_DTM layer is given on this page:
https://portal.emodnet-bathymetry.eu/services/services.html
Have a try.
Kind regards
Dick M.A. Schaap
Technical Coordinator
On 6/9/2022 11:39 AM, Dick M.A. Schaap wrote:
Dear ….,
Thank you for your interest in EMODnet Bathymetry.
Indeed the High Resolution areas are only available for viewing, zooming in and downloading via the Viewing and Download service (https://portal.emodnet-bathymetry.eu) and not as part of the WMS service. A reason for this is that the WMS service has a unified resolution over the whole European sea area, while the HR-DTMs are individual sites with different higher resolutions.
Anyway, we hope you can work with the individual downloaded data files.
Kind regards
Dick M.A. Schaap
Technical Coordinator

On 5/19/2022 8:58 AM, noreply@maris.nl wrote:

Name	
Email	
Feedback / Question	Hello dear EMODnet team, I am looking for high resolution bathymetry data along the North Sea coast (up to 5km offshore is fine). The EMODnet project looks like a very suitable data source for this purpose. I saw the neat WMS interface that I can access via python. However, I cannot find the "High Resolution Bathymetry" layer as described here: https://portal.emodnet-bathymetry.eu/help/help.html#006 Instead I only see the following layers in the WMS data: 'coastlines', 'emodnet:contours', 'emodnet:mean', 'emodnet:mean_2016', 'emodnet:mean_2018', 'emodnet:mean_atlas_land', 'emodnet:mean_multicolour', 'emodnet:mean_rainbowcolour', 'emodnet:quality_index', 'emodnet:source_references' For the high resolution bathymetry I was only able to download the csv-structured emo files, which surely is the right data, but cannot be accessed as convenient as via the WMS interface. Is there a way to access the high resolution bathymetry data via the WMS interface? Thanks a lot and best regards,

---

Subject:EMODnet Bathymetry Feedback form
Date: Tue, 14 Jun 2022 08:56:38 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To:

Dear ..,

Thanks for your interest in the EMODnet bathymetry.
Concerning your question, lets describe the procedure first. The most common method to measure the bathymetry is with an echo-sounder from a ship. Since the sea-level changes over time, the depth is converted from the sea-level at the time of the measurement to the value at low tide (Lowest Astronomical Tide (LAT)). The use of LAT for nautical maps is based on an international standard and used world-wide. For modelling (and a few other applications) in shallow coastal waters the Mean Sea Level (MSL) is a more useful vertical reference. The difference can be computed from measurements at tide-gauges, but are not easily extrapolated to the full grid based on tide-gauges only. Therefore, in EMODnet Bathymetry we use a numerical model (GTSM), developed and run by Deltares (NL), to convert

the bathymetry from LAT to MSL. This way, we deliver the EMODnet Bathymetry DTM both according to LAT and to MSL, so that users can select the version that is most appropriate for their work.
In the Adriatic, depending on where you are, 60cm sounds like a realistic difference for the difference between MSL and LAT.

Hope this answers your question.

Kind regards,
Dick M.A. Schaap
Technical Coordinator

On 6/3/2022 10:13 AM, noreply@maris.nl wrote:

Name	
Email	
Feedback / Question	Dear Service, I am a PhD student and my research focuses on the monitoring of coastal areas in Italy. I recently downloaded from your service the bathymetry related to a part of the Adriatic Coast of the Emilia-Romagna region in Italy. During the download, it was possible to get different data types, in particular one with the prefix "MSL" and one without. I downloaded both the data and found a difference in the depth values of about 60 cm in the whole area. Can you explain what the reason for this difference is? What are the references for the height values, MSL and LAT? Thank you Best Regards

---

Subject:RE: EMODnet Bathymetry Feedback form
Date: Thu, 30 Jun 2022 07:59:28 +0000
From: Leo Hayes <l.hayes@6alpha.com>
To:

Good Morning Dick,

Thank you for your email, I can confirm that it is working correctly for me this morning.
Kind regards,

From: Dick M.A. Schaap <dick@maris.nl>
Sent: 30 June 2022 08:09
To:
Subject: EMODnet Bathymetry Feedback form

Dear ..,
Thanks for your interest in EMODnet Bathymetry. We experienced a short disturbance with 1 of our OWS servers (out of memory). This was corrected immediately; however it could have been the cause of the problem you had.
Could you try again and let us know?
Kind regards
Dick M.A. Schaap
Technical Coordinator
On 6/29/2022 1:53 PM, noreply@maris.nl wrote:

Name:	
Emailaddress:	
Feedback:	I am attempted to download an area of interest GeoTiff off the south coast of Ireland, but on multiple attempts it is providing an empty file (less than 1KB). Where I have used this service

previously, it has worked without issues, including most recently off the east coast of Ireland. Are there any problems currently with this service, or could it be an error on my part?
