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 (7)

Reporting Period: 01/07/2022 – 30/09/2022

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 5 data providers from 40596 to 41252 CDI entries while the number of Composite DTM entries has increased from 266 to 269. Major new contributions were made by Norwegian Hydrographic Service (NHS) (596, all CC-BY-4.0). The population phase for CDI and CPRDs 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. Of course, more CDI contributions can be expected as part of regular maintenance and also when checking the consistency between the draft 2022 DTM and existing CDIs / CPRDs, which have to match 100%. All data providers have now fully fulfilled their population activities. Data providers are also underway with preparing and populating into Sextant additional HR-DTMs, which now counts 261 HR-DTMs of which 245 are published as part of 2020 DTM release. These additional HR-DTMs 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

During the reporting period, all the 12 regional DTMs have been received from their regional coordinators for final checks and integration. Compared to the 2020 release data delivery, most regional coordinators have now delivered their regional DTM as a single NetCDF file. And all regional coordinators have used the latest version of Globe (version 1.20.8) which is much more stable and capable compared to the Globe version available in 2020. The largest file size received was almost 35 Gigabytes. Validation of each of the regional grids is currently ongoing by partner GGSGc. At the current stage the 2022 data set comprises of 150 composite DTMs CPRDs and 19031 CDI entries, compared to respectively 122 and 16243 earlier in the 2020 release. The quality of the grids received from the regional coordinators is recognised to be better compared to the 2020 release. One of the reasons of this finding is that the Globe software has improved a lot, noticeably on the selection and ordering of the different bathymetric sources. Only minor issues were detected mainly dealing with missing data. Minor data gaps were detected in the Artic Sea rDTM on the edges of the original IBCAO data source data tiles. This problem will be solved by filling the (1 pixel) gaps with data from the 2020 release. Some regional coordinators have included data without populating the CDI/CPRD field. This is a serious mistake but has been noticed to be possible in Globe. It has been agreed to add an additional check in the software to avoid this in future release. The individual cases where this occurred in the coming release have been solved on a case by case basis. Further checks are currently being made, especially with respect to the filiation of the bathymetric sources composing the DTM (source reference layer). A full list of CDIs and CPRDs has been sent to partner MARIS for checks against the SeaDataNet CDI and Sextant catalogues. After reception of the correction list from MARIS the corrections will be applied. This might require action from data providers to populate missing CDIs / CPRDs. After that major consistency check, the complete DTM will be generated and will be made available internally to the group for final visual check, prior to making the preparations for the publishing as a new release. This will be combined with other planned products, such as the quality index layer that will be generated from the Source reference layer and the content of the metadata.

For the 2022 release, the Caribbean Sea will be part of the new full EMODnet Bathymetry DTM coverage. Ifremer has been responsible for the regional coordination. The area of coverage corresponds with the presence of EU member states overseas territories. The regional DTM is compiled based on available data received from EU member states (mostly France and Netherlands). The methodology and the tools used (Globe) are comparable to the one used for the other regional DTMs. Areas without bathymetric coverage, originating from the members of the consortium, are filled with GEBCO and GMRT holdings. The Global Multi-Resolution Topography (GMRT) synthesis is a multi-resolution compilation of edited multibeam sonar data collected by scientists and institutions worldwide and held at Lamont University. These data are known to be reviewed, processed and gridded by the GMRT Team and merged into a single continuously updated compilation of global elevation data. Contact will be made with Lamont University to arrange for proper acknowledgement.

One part of the DTM integration process is also 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. 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. A first version of the satellite derived coastline for the Caribbean has now been produced and is currently under review by the partners.

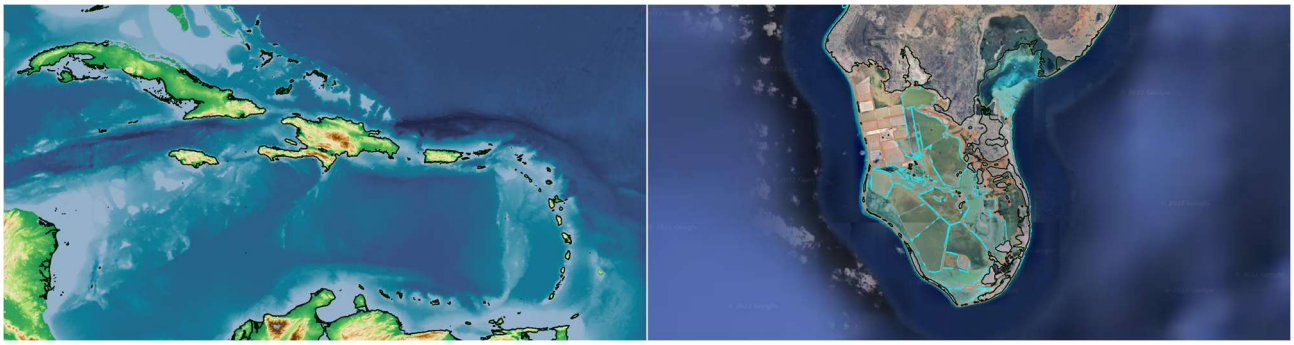

Image: First version of satellite derived coastline for Caribbean (left), and a detail of a bay and the salt works at southern Bonaire (right)

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. New data received has been processed and included into the collection. An update of the report on coastlines and baselines has been written and has just been circulated to the full consortium for review. The table below gives an overview of progress.

No	Country	Baseline	Coastline
1	Albania	Available	N/A
2	Belgium	Available	Available
3	Bosnia and Herzegovina	N/A	N/A
4	Bulgaria	N/A	Available
5	**Croatia**	**Available**	Available
6	**Cyprus**	**Available**	N/A
7	Denmark	Available	Available
8	**Estonia**	Available	**Available**
9	Finland	Available	N/A
10	France	Available	Available
11	Georgia	N/A	N/A
12	Germany	Available	Available
13	Greece	Available	Available
14	**Iceland**	Available	**Available**
15	Ireland	Available	Available
16	**Israel**	**Available**	Available
17	Italy	Available	Available
18	Latvia	Available	Available
19	Lithuania	Available	N/A
20	Malta	Available	Available
21	Monaco	N/A	N/A
22	Montenegro	N/A	N/A
23	Netherlands	Available	Available
24	Norway	Available	Available
25	**Poland**	Available	**Available**
26	Portugal	Available	Available
27	Romania	Available	Available
28	Russian Federation	N/A	N/A
29	Slovenia	Available	Available
30	Spain	Available	Available
31	**Sweden**	**Available**	Available
32	Turkey	N/A	N/A
33	Ukraine	N/A	N/A
34	United Kingdom	Available	Available

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

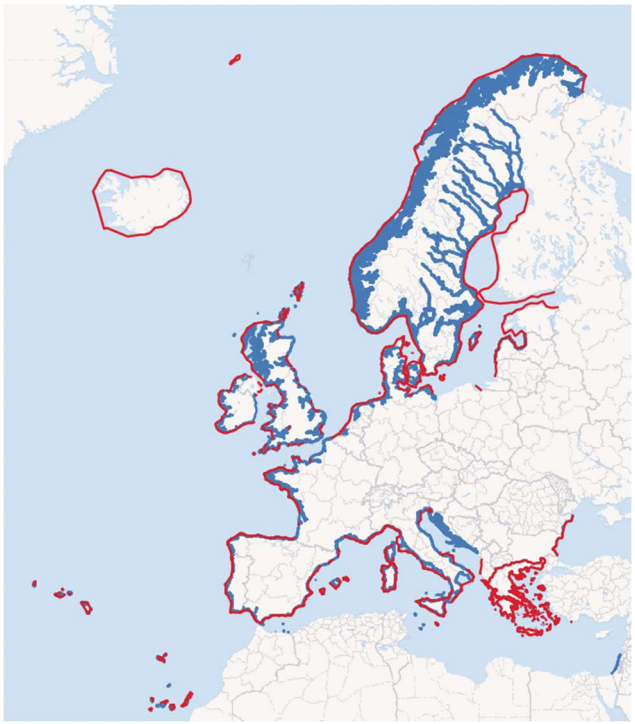

Image: Official coastlines and baselines around Europe

A final activity is to establish tidal bathymetry for the Venice Lagoon, led by Deltares and CNR-ISMAR. 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 is 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. In the past few months, the available optical satellite imagery has been studied. The high silt concentration makes the detection of the bathymetry very challenging. Next, the study will be finalized and reported.

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 supported by actions on JIRA (reported below). In the reporting period a lot of email communication took place between the Central Portal and EMODnet Bathymetry technical teams, and there was also a joint discussion at the EMODnet TWG meeting 20-21 September 2022, which was followed by a short webconference between parties. In the period, EMODnet Bathymetry has undertaken several actions of relevance for the migration, of which a few are highlighted below:

- The narrative EMODnet Bathymetry section on the CP has been reviewed again and it will be required to add URLs, preferably 'deep links' to the Bathymetry sections and maps in the CP Catalogue and CP Map Viewer. This will be done, once the migrated Central Portal has gone live as this determines the URLs. Moreover, some illustrations should be added to make it more attractive as it is now quite a textual presentation. There has been some discussion about the definition of deep links, but that seems now to be clear between parties;
- The current status of deploying the bathymetry map layers and their specific functionalities for settings and calling up information has been further discussed in a recent bilateral webconference between representatives of the CP team and Bathymetry team and actions have been formulated which are to be implemented soon. These concern e.g. how and what metadata are retrieved and shown when clicking on the Source References map and the CDI surveys map, or how to configure at the map and how to download the Satellite Derived Coastlines product. CP team will inform Bathymetry about progress so that further testing can take place.
- Downloading of all DTM tile files (132) and HR-DTM files (currently 245) is foreseen at the CP by the Central Products Catalogue service and by means of a map visual interface as currently in the original Bathymetry Viewing service. The Bathymetry team has made available an OGC-CSW Sextant service which contains metadata for all DTM tiles with their different formats, for the HR-DTMs, and for other relevant EMODnet Products and Maps as part of INSPIRE compliance. All records (currently 410) have been checked for details and where relevant, outfitted with links for downloading (from the EMODnet Bathymetry back-office) and for viewing as maps. The latter are currently pointing to the original Map Viewer, but will be updated to CP Map Viewer links, once the CP migration has been finalised. The CP team has recently harvested the CSW, but the numbers do not match yet, so further deliberation between parties will take place after posting on JIRA. The hosting of the downloadable files is done at the back office of EMODnet Bathymetry as that will prevent misunderstandings and unnecessary delays.
- Recently, it has also been agreed that downloading of DTM tiles and HR-DTMs should also be possible in a visual way through the CP Map Viewer as that is the way that most users will prefer over using the CP Catalogue to find the right DTM tiles. It will be solved by adding a map layer to the CP Map Viewer which will depict the outlines of the DTM tiles of the different releases (currently 2016, 2018, and 2020) and the HR-DTMs. Users should then be able to click on the grids to retrieve the Catalogue information and the download paths. The Bathymetry team is working on this extra map layer. This functionality 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. Making use of the general EMODnet ERDDAP function of drawing a polygon and download the associated data set is fine for casual queries but not for systematic downloading, in particular by modellers.

Concerning the activity under Task 3 relative to the online Collaborative Virtual Environment (CVE), regional DTMs are now being integrated in the system following the review exposed in the description of Task 2. Doing so will enabling the CVE environment to be prepared for the 2022-2024 EMODnet realisation, by providing a base layer against which new data (or new products) could be compared. Differences will be visualised and

qualified as problematic areas or improvements. This way the CVE will enable a truly implemented collaboration between the data providers and the basin aggregators.

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, act as Chair and Vice-Chair of the GEBCO subcommittee TSCOM (Technical Subcommittee on Ocean Mapping). 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:

The future EMODnet bathymetry full grid release, planned for the end of the year, will be an occasion to reinforce the good relationships with the secretariats of the Regional Sea Conventions who are kept up-to-date of the EMODnet Bathymetry services and products, and where possible, engaged in wider promotion and contributing to mobilising more potential data providers and product users. Moreover, the entangled collaboration with GEBCO and the IHO will also be further enhanced when the grid will be delivered.

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 6th quarterly progress report for the new contract which was accepted by EU (CINEA and DG MARE).

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, M19	
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	Delivered	M15	
D3.5i: Regional DTMs with common resolution of 1/16 arc minutes grid	WP3	M17	Delivered	M18	See above for more details
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	Well 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	Draft report under review		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	WP4	M3	Delivered	M1	See above for details on the status

services delivered for common functionalities					
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
EM635 – Provide tools and guidelines section input	Pending	To provide requested elements		
EM631 – All to standardize the navigation menu	Pending	Check with other themes the coherency of the navigation menu		
EM624 – Question about deep links	Partly resolved	Awaiting CP team actions to provide solution		
EM607 – Centralisation Checklist for review	resolved	Discussed at TWG		
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.		
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.		
EM390 – Bathymetry review of the new CP Map viewer	In progress	Issues as explained in EM487 and EM188 are still valid. Recently, a meeting took place between GGSgc and CP team which resulted in actions by CP team for solutions. Bathymetry to follow.		

EM-563 Feedback on CP Main Menu	pending	Some feedback delivered about Product Catalogue missing search by Thematics. See also EM527Further feedback planned later as we are focusing on Bathymetry first and not overall CP.		
EM527 – Bathymetry – EMODnet Catalogue Tags	Pending	After harvest of OGC CSW from EMODnet Bathymetry, there are now two EMODnet Bathymetry tags in the CP Catalogue with different subsets. Sholuld only be one EMODnet Bathymetry tag !		
EM-294 Dashboard issue with Helpdesk page views	Pending again	Grafana has not been updated for Q3 so it does not give any data or graphics for Q3.		

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 map layer with outlines of DTM tiles and HR-DTMs to ease downloading by professional users	In progress	Recently agreed with CP Team. Bathymetry to provide the map layer including links.	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
7 July 2022	University of Algarve, PT	Problem with WCS service	Email feedback form	Two days later	Resolved	Explained that WCS only works for European DTM	
19 July 222	?/?	Question about access to SDB areas	Email feedback form	Three days later	Resolved	Explained how use is made of SDB and referred to partner EOMAP	
9 August 2022	?/?	How to import EMO files in QGIS	Email feedback form	Next week	Resolved	Guidance given	
24 August 2022	IPGP/ FR	How to select an area	Email feedback form	Next week	Resolved	Guidance given and also referred to HELP	
31 August 2022	Geo-4D/UK	What vertical reference is used	Email feedback form	Same day	Resolved	Explanation given of LAT and MSL options	

6 Sept 2022	?/?	Looking for a bathymetric map of the Mariannes	Email feedback form	Same day	Resolved	Explained our focus on European waters	
24 Sept 2022	YCMN/FR	Problem with DTM downloads	Email feedback form	Two days later	Resolved	Guidance given how it works	

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 July 2022	VTC	EMODnet Regional Coordinators meeting	yes	O	Approx. 15 participants. Progression discussed and actions to undertake prior to the delivery of regional DTM
6 July 2022	Brest	Décénie des sciences des oceans (UNESCO COI)	no	A	Approx. 60 participants. Multiple EMODnet mentioned.
18 July 2022	VTC	EMODnet progress meeting: Centralisation state of play	no	A	
22 September 2022	VTC/Brussels	12th EMODnet TWG	yes	A	Following actions and progress made on the Centralisation effort. Progress from all themes, including Bathymetry
22 September 2022	VTC/Brussels	2nd EMODnet-Copernicus Marine Thematic workshop on coastal issues	yes	A	Discussion on potential collaborations between members of both groups. Action to be undertaken on the bathymetry theme (see below)
26 September 2022	VTC	EMODnet Bathymetry presented by MARIS at EUROFLEETS+ Workshop	yes	A	To present EMODnet Bathymetry and needs / options for bathymetry data sharing

				Total # of meetings organised = 1	
				Total # of meetings attended = 5	

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
8 October 2022	VTC	Internal meetng about synergy with Copernicus in the SDB field	O	Internal meeting to discuss strategy
14 October 2022	VTC	EMODnet Bathymetry / Copernicus Marine actions follow-up	A	To discuss potential collaboration between both groups on coastal bathymetry and satellite estimation of the bathymetry.
26-28 October 2022	Southampton	Map the Gaps / GEBCO meetings	A	Annual GEBCO meetings and broad attendance meeting on SEABED 2030 progresses.
6-8 December 2022	Monaco	Hydro 2022	A	International Hydrographic conference. A dedicated presentation on EMODnet Bathymetry has been accepted
5-6 December 2022	Monaco	Full EMODnet Bathymetry Meeting	O	Full group meeting to be potentially organised back-to-back with the Hydro 2022 conference.

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 again a substantial increase of CDIs.
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 an enormous increase in number of downloaded CDIs compared to previous quarter goinmg from 285 to more than 187000 cdis. This is largely because of students at 2 chinese universities, Hohai Un iversity and University of Nanjing, that went downloading enormous amounts of CDI and related datasets. So this quarter almost 3 Terrabyte of survey datases were downloaded. Number of users stayed stable at 28 from 31 previous quarter.
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 3 new CDTMs as extra input for the production of the new Regional DTM releases. Number of published HR-DTMs is fixed till the new release. Gatherng of new HR-DTMs is ongoing but not yet included as it is internal for now.
B) Usage of data products in this quarter	Shopping module and analytics reporter of the	Again a very large volume of downloads, both in numbers (> 10000) as in volume (> 1.2 TerraByte). This quarter, twice as much HR-DTMs have been downloaded. The number

	Viewing and Download service CDI catalogue service	of WMS requests is slightly less (-10%) while the number of WFS requests sees a large increase (+66%).
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).
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 high for a few selec5ed use cases. Seems that visitors are really finding the use cases.
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	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. In time the statistics are very steady.
10. Visibility & Analytics for web sections	Matomo – Grafana	This indicator shows the interest of users for specific sections of the website, excluding the Bathymetry Viewing and Download service. The Products section and the CDI service receive most attention, followed by the CPRD products catalogue service, while Help desk is last (as expected). The statistics are very steady in time.

11. Average visit duration for web pages	Matomo – Grafana	This indicator shows the average visiting time of users for specific services of the website. The stats for the Bathymetry Viewing and Download service. The Products section and the CDI service are largely the same, followed by good attention for the documentation and the web services pages. The statistics are very steady in time.

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

Subject:EMODnet Bathymetry Feedback form
Date: Thu, 7 Jul 2022 09:00:25 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To:

Dear ...,
Thank you for your interest in EMODnet Bathymetry.
Concerning your question: the WCS service for area of interest works on the DTM that EMODnet has generated and maintains for the European sea area. The EBWBL is offered as an extra service to provide a global baseline, but only as an OGC WMTS service without downloading. It is a compilation of the European DTM of EMODnet with GEBCO DTM. Please check the GEBCO website (https://www.gebco.net/) on how to make use and download their DTM product and parts of it.
Kind regards,
Dick M.A. Schaap
Technical Coordinator

On 7/5/2022 3:27 PM, noreply@maris.nl wrote:

Name	
Email	
Feedback / Question	To whom it may concern, I would like to access the EMODnet Bathymetry World Base Layer (EBWBL) and download an area around Pamlico Sound in the USA. However, when I download my area of interest from the Bathymetry Portal (https://portal.emodnet-bathymetry.eu) the file I get seems not to have data. Could you please help me figure out if and how can I download the bathymetry in USA? Kind Regards,

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Subject:EMODnet Bathymetry Feedback form
Date: Fri, 22 Jul 2022 14:14:31 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To:
CC: Knut Hartmann <hartmann@eomap.de>

Dear … ,
Thank you for your interest in EMODnet Bathymetry.
The Satellite Derived Bathymetry products are part of the so-called Composite DTM records which we use internally as part of the input for the integrated EMODnet DTM. Therefore, these composite DTMs are included in a Catalogue with only metadata, which also is interlinked with the source reference layer in the DTM viewer service. This way, users can see which data sets have been included to build the EMODnet DTM.
Considering your interest in the Satellite Derived Bathymetry Peloponnese, South Aegean, Attica, West Greece - Greece data file, I suggest that you discuss this with the Data Producer and Owner, which is EOMAP from Germany. I put Knut Hartmann of EOMAP in CC , who is the right contact for this.
Kind regards
Dick M.A. Schaap
Technical Coordinator
==========
On 7/19/2022 5:27 AM, noreply@maris.nl wrote:

Name	
Email	
Feedback / Question	Hi! I have used your service before to great success, however, I visit the webpage today and the format/discovery service has been updated. I am interested in downloading the "Satellite Derived Bathymetry Peloponnese, South Aegean, Attica, West Greece - Greece" shapefile for GIS work, but cannot find anyway to download it. (https://www.emodnet-bathymetry.eu/metadata-amp-data/composite-dtms-catalogue-service#/metadata/SDN_CPRD_4667_greece1003). Similarly when I use the discovery service, I cannot locate it in the search area. Any help would be appreciated!

Subject: EMODnet Bathymetry Feedback form
Date: Mon, 15 Aug 2022 09:42:14 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To:

Dear …,
Thank you for your interest in EMODnet Bathymetry.
EMODnet DTM files are delimited ASCII files and can be imported in QGIS as point clouds. Although .EMO files are regular spaced in a grid with a 1/16 arc minute grid size, QGIS does not automatically import these files as grids. It is up to the user to use the gridding tools available in QGIS to work with the data in a gridded form. However, if you want to use EMODnet DTM data directly in QGIS in gridded form, we advise you to use the ESRI ASCII grids instead.
Kind regards
Dick M.A. Schaap
Technical Coordinator

On 8/9/2022 4:22 PM, noreply@maris.nl wrote:

Name	
Email	
Feedback / Question	How to import EMO files in QGIS?

Subject: EMODnet Bathymetry Feedback form
Date: Wed, 31 Aug 2022 13:01:20 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To:

Dear ..,
Thank you for your interest in EMODnet Bathymetry.
The digital bathymetry can be downloaded in predetermined DTM tiles in different formats. There is also a WCS service to draw and download specific areas of interest.
Both methods are explained in the HELP of the Bathymetry Viewing and Download service at:
https://portal.emodnet-bathymetry.eu/help/help.html#007
Note that of course you also can zoom in - out to view selected areas.
Kind regards,
Dick M.A. Schaap
Technical Coordinator
====
On 8/24/2022 10:07 AM, noreply@maris.nl wrote:

Name:

Emailaddress:

Feedback: How to select an area? There is no tool to do it.

Subject:EMODnet Bathymetry Feedback form
Date: Wed, 31 Aug 2022 13:36:11 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To:

Dear …,
Thanks for your interest in EMODnet Bathymetry.

Most of the EMODnet bathymetry source data is collected with respect to chart datum, which is in most places close to Lowest Astronomical Tide (LAT). This is the common vertical reference as regulated by IHO. The source data is then quality checked and merged at a regional level and finally for all of Europe into a unified European gridded dataset.
For some applications, such as modelling, it is often more convenient to work relative to Mean Sea Level (MSL). For this purpose EMODnet-bathymetry also provides the European gridded dataset relative to MSL. This has been computed by applying a correction for the LAT to MSL difference based on a tidal model, operated by Deltares (NL). A depth value of zero in that dataset thus represents a value where the seabed is roughly at MSL.
Kind regards
Dick M.A. Schaap
Technical Coordinator

On 8/31/2022 12:42 PM, noreply@maris.nl wrote:

Name

Email

Feedback / Question Hello, what vertical datum is the EMODnet mean sea level bathymetry referenced to?

Subject:EMODnet Bathymetry Feedback form
Date: Tue, 6 Sep 2022 10:42:42 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To:

Dear …,
Thank you for your interest in EMODnet Bathymetry. We focus mostly on the European seas and North West Atlantic Ocean. Therefore, we cannot help you with digital bathymetry for the Mariana trench. However, our colleagues from GEBCO, the General Bathymetric Chart of the Oceans, should be able to provide you with gridded bathymetry for that area. See htpps://www.gebco.net for more information.
Kind regards
Dick M.A. Schaap
Techical Coordinator

On 9/6/2022 10:25 AM, noreply@maris.nl wrote:

Name

Email

Feedback / Question Hello, I am looking for a bathymetric map of the Mariannes, would you have this on your website ? It is for a web educative of series about the oceans, developed by the company Gedeon Programmes. Thank you for your help.

Subject: EMODnet Bathymetry Feedback form
Date: Mon, 26 Sept 2022 15:32:19 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To:

Dear ….,
Thank you for your interest in EMODnet Bathymetry and sorry for delay in answering to your question.
Indeed, one can order the DTM/ESRI ASCII and we have found several requests from you in our logs, which also indicate that you should have received a return message with a download link. Normally, the messages are send by: EMODnet Bathymetry <noreply@emodnet-bathymetry.eu>
Please check your spam, in case you cannot find the messages.
Will hear from you again.
Kind regards,
Dick M.A. Schaap
Technical Coordinator
==========
On 9/24/2022 5:27 PM, noreply@maris.nl wrote:

Name:

Emailaddress:

Feedback: Is the DTM/EsRI ASCII data available to individual users ? I made several requests to which I got no answer. Regards