



EMODnet



European Marine
Observation and
Data Network

EMODnet Thematic Lot n°2 – GEOLOGY

EASME/EMFF/2020/3.1.11/Lot2/SI2.853812

Start date of the project: 25/09/2021 (48 months)

**Renewal of the Centralisation Phase contract
25/9/2023 – 24/9/2025**

Quarterly Progress Report (Q4/2024)

Reporting Period: 01/10/2024 – 31/12/2024



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1. Highlights in this quarter

Task 1: Maintain and improve a common method of access to data held in repositories. As the principal holders of marine geological information, the EMODnet Geology partnership ensures that data from all of the European regional seas are provided to the project. The project is built on information primarily held by the project organisations, but also connected to other owners of information by offering data delivery to EMODnet either through the EMODnet Data Ingestion or straight to the EMODnet Geology.

During this renewal phase of the contract, work on collection and harmonisation of new datasets and deliveries to the different work packages were mainly scheduled to begin in Q1 or Q2 of 2024. Data deliveries from project organisations to the WP's will most likely continue until the end of the renewal phase.

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. In general, the data sets submitted by the project members will be added to the different EMODnet Geology data products and will be updated on the Central Portal by the end of the renewal phase of the project in 2025.

Task 3: Develop procedures for machine-to-machine connections to data and data products. We have several connections available to external applications – specifically OGC standards WMS, WMS-C, WFS, and CSW. All project organisations can connect directly to the portal PostgreSQL-database and create advanced queries on the data products of the project.

Task 4: Contribute data, data products and content to a Central Portal that allows users to find, view and download data and data products. There have been several updates this quarter. All layers under the work package, Submerged Landscapes, have been updated and layer groups reconstructed. All layers under the work package Sea-Floor Geology have been updated. Under the work package Coastal Behaviour, a new product has been created: Coastal Resilience. This is running in the development version of the map viewer and is only waiting for an official launch date. Belgium, Malta, and Turkey have had their index data regarding boreholes and geophysics updated.

In general, new releases and major updates for Seabed substrate and Seafloor geology data products are included in the Progress Indicator 2.A Sea basin coverage (Chapter 9. Monitoring Indicators) after they have been published on the Central Portal. The Seafloor geology data products updated during Q4/2024 did not include new area extensions and therefore the indicator has remained about the same. In general, the data products describing Coastal behaviour, Events and probabilities, Minerals and Submerged landscapes are missing from the Progress Indicator 2.A, because these features are mainly line or point data or if areal, then so small that they don't cover such areas that they would contribute to any percentage of coverage of whole sea areas.

Task 5: Contributing content to dedicated spaces in Central Portal. We have been working closely with the Central Portal to have our data products available to any desired spaces on the Central Portal.

Task 6: Ensure the involvement of regional sea conventions. Nothing to report.

Task 7: Contribute to the implementation of EU legislation and broader initiatives for open data. We have been working in close cooperation with DG MARE, CINEA, and the Secretariat to contribute to all joint EMODnet efforts on the implementation of EU legislation and broader initiatives for open data. More specifically our data products could be useful e.g., for Maritime Spatial Planning Directive, Marine Strategy Framework Directive, Habitats Directive, Biodiversity Strategy, Blue economy, Green Deal, Blue Growth and European Critical Raw Materials Act.

Several EMODnet Geology organisations are participating in HORIZON 2.5 - Climate, Energy and Mobility project Geological Service for Europe (GSEU), which enables synergy and direct feedback between these two

projects. From the GSEU side, EMODnet Geology attributes are being queried and translated into applied attributes needed to build a geo-assessment matrix for determining seabed suitability to construction of offshore windfarms. In due time, the intended end product will be contributed to the EMODnet Central Portal as an applied data product.

The former EMODnet Geology coordinator is in the Advisory Board of two Horizon Europe (HE) projects (HE TRIDENT and HE S34I) and thus acting as a link between these HE projects and EMODnet.

EMODnet Geology coordination and/or representatives have been in direct communication with European Digital Twin of the Ocean (EDITO) to enable the use of the EMODnet Geology data layers and to promote the interaction between these initiatives.

Task 8: Monitor quality/performance and deal with user feedback. In this quarter, the services have run without issues. All tickets from the help desk have been resolved within the time limit.

Task 9: Maintain the existing thematic web portal for a maximum of six months from the start of the projects. The original portal is now closed because we moved to a new server environment in the last quarter. The original thematic portal had been working for nearly two years since the launch of the Central Portal in January 2023.

Highlights of the different work packages:

WP1 – Project management. The EMODnet Geology coordination attended a series of EMODnet related meetings at the beginning of October 2024 (7.-9.10.2024) in Brussels. These included Steering Committee (SC) meeting, Technical Working Group (TWG) meeting, Open Sea Lab (OSL) planning meeting and Governance Task Team (GTT) meetings. The technical coordinator of EMODnet Geology also participated in the TWG meeting. The EMODnet Geology coordination/representatives have also attended online meetings and workshops, e.g.: SC meeting 13.11., GTT meeting 29.11., EMODnet Vision 2035 Drafting group meetings (29.10., 27.11.), S34I General Assembly (2-3.10.) and EMODnet Marine Data for Ports, Marinas and Boating Workshop (22.10.).

The EMODnet Geology Steering Group had two online meetings during this reporting period. Topics included planning of the project meeting among others.

An EMODnet Geology project meeting was organised in Trondheim, Norway, 4-11 November 2024. The meeting brought together about 50 delegates from over 20 organisations. Key discussions included update on Lot's activities in producing harmonised marine geological data products and plans for the coming months.

In addition, the progress of the first year was assessed at the project meeting in Trondheim. Based on the discussion, all work is progressing according to plan. Neither the WP leaders nor the individual project organisations reported any significant delays. There are/have been some longer sick leaves in the project team, but despite this, no significant delays are expected.

News articles about the Trondheim meeting were published in the EMODnet Newsletter (<https://emodnet.ec.europa.eu/en/emodnet-geology-meeting-trondheim-norway>) and on the meeting host's, Norwegian Geological Survey's, website (<https://www.ngu.no/nyheter/stort-europeisk-samarbeid-om-marine-geodata>) in November 2024. In addition, a news article on the updated EMODnet Geology data products (Seafloor geology and Submerged landscapes) was published in EMODnet Newsletter in December 2024.

WP2 – Geological data specification and sourcing. WP2 will continue throughout the whole renewal phase. This data will be processed and collected during Q2/2024-Q3/2025 and used in final updates and/or new data products by the end of the renewal phase by September 24, 2025.

The individual data deliveries to the WP leaders for quality check and compilation have been included in the Indicator 3 of the Excel file. During this period, all layers under the themes, Submerged Landscapes and Sea-Floor Geology, have been updated.

WP3 – Seabed substrate. During this reporting period updated WP3 guidelines (Seabed substrate, Erosion, sedimentation rates and recognizing sedimentary environments) with clarified instructions and a new EMODnet Geology nextcloud site address were sent to the project team. A general WP3 presentation was held in EMODnet Geology project meeting, in Trondheim 5.-7.11.2024.

Overall, four team members have delivered seabed substrate data at 5k, 10k, 25k and 50k scales (Black Sea, Caribbean Sea, Baltic Sea and Mediterranean Sea). Two team members have delivered sedimentation rates data (Baltic Sea and Adriatic Sea) and some erroneous records have been removed by project member's request. One team member has provided seabed erosion index data. One organisation provided information for the additional erosion work "recognizing sedimentary environments".

WP4 – Seafloor geology. Work on the vocabulary of the marine geomorphology continues and several on-line meetings of the working group took place in order to produce a first draft. The group met in person at EMODnet project meeting in Trondheim in a plenary WP 4 workshop. Here the draft table of a machine-readable vocabulary on marine geomorphology was presented and discussed. At the moment the focus is to work on the hierarchical relations of the terms. In addition, the WP 4 metadata have been reviewed to improve accessibility and findability of data sets.

WP 4 organised a workshop on harmonisation of the Western Baltic Sea Quaternary geology and the Northern Atlantic geomorphology at the Trondheim project meeting with members from Denmark, Poland, Germany, Sweden, Iceland, Faroes Islands, Norway. The outcome was considerable progress in map harmonisation in the western Baltic Sea and vivid discussion and harmonisation of features in the Northern Atlantic.

WP 4 harmonised its data products within the layer "General Physiographic Features" from France and Spain in the Bay of Biscay. This harmonised data layer has been published at the EMODnet data portal as well. WP 4 updated and published data layers on geomorphology, pre-Quaternary geology and Quaternary geology on the EMODnet Portal. This information about the data product update was also published in the EMODnet Newsletter, December issue.

WP5 – Coastal behaviour. The release protocol for the coastal resilience/vulnerability web service was triggered during Q3, 2024. The new data product (fig. 1) is currently being quality checked in the Central Portal test map viewer to ensure that it is ready for release in Q1 2025. An explanatory article has been accepted for publication in the EMODnet Special Issue of the Quarterly Journal of Engineering Geology and Hydrogeology. Publication of the article, Gold Open Access, will be synchronised with the release of the data product and a link to the paper provided in the product metadata.

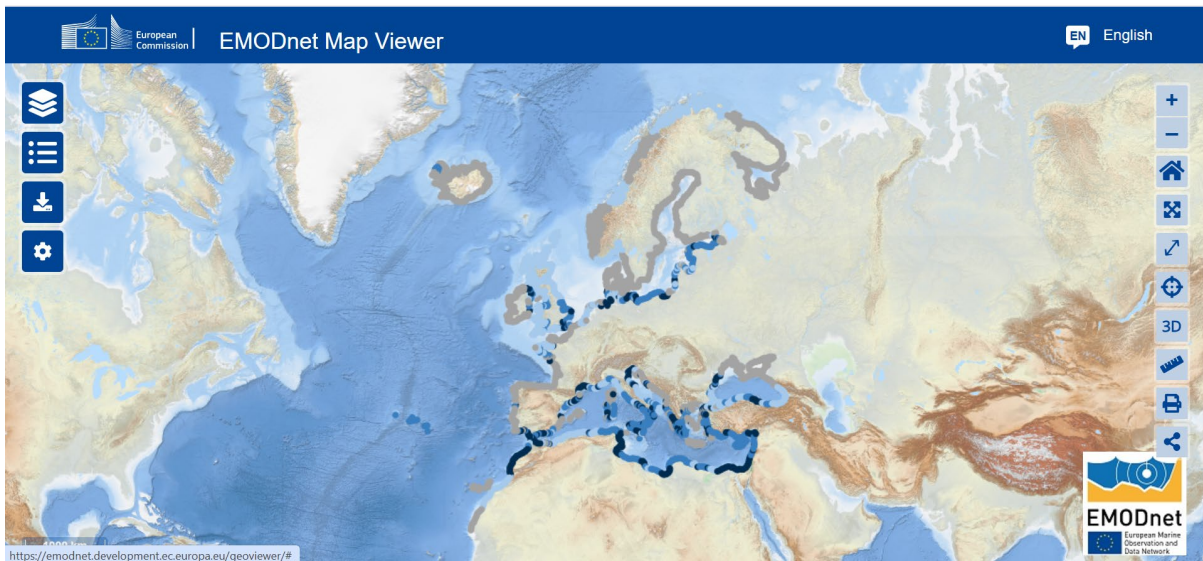


Figure 1. Coastal resilience/vulnerability data product in Central Portal test map viewer

Work for the Coastal Migration from satellite data and also field data will commence in Q1 2025. For the Coastal Migration based on satellite data scripting for the creation of a revised coastline-migration web service using satellite data is well underway, with a fully functional QGIS file that now needs to be made ready for publication on the Central Portal (fig. 2). Remaining challenges are optimal visualization of time series, file size and associated performance, and addition of two extra migration categories. Furthermore, for both the satellite and field data products, a split into a broader range of classes will be investigated. For the field data product, there will be investigations into upgrading the shoreline to a more recent/detailed version.

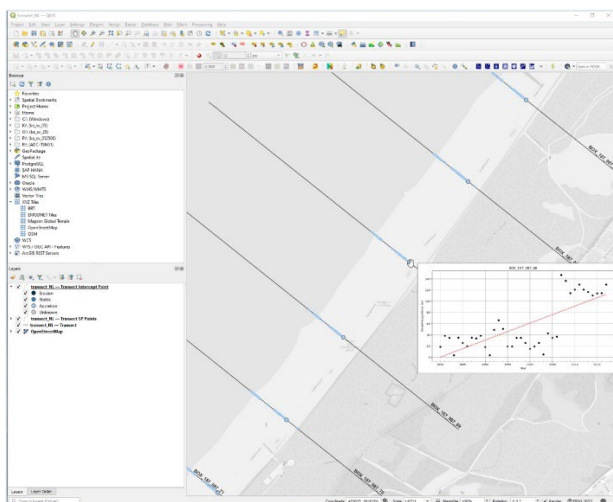


Figure 2. Coastline migration data product is in preparation.

WP6 – Geological events and probabilities. A thorough revision of WP6 data allowed to clarify problems concerning information contained in the attribute tables, which is not always displayed correctly. Updated fields will be displayed in the next delivery. Issues concerning data harmonisation from neighbouring areas were discussed at the EMODnet Geology meeting in Trondheim to find shared solutions which will be applied in the next update of products to be released on the Central Portal.

Cooperation agreements until the end of the current phase were confirmed with other Italian Public Research Institutions and Universities.

Two requests of information by EMODnet Portal users were received and answered. Issues concerning metadata not correctly displayed on the Portal were solved.

Updates were received from Türkiye, Caribbean Sea (from Spanish colleagues), Albania, Norway during the reporting period.

WP7 – Minerals. During this reporting period no new data for Mineral data layers were received from project organisations – final call for updated data will be sent in February 2025. Data for Marine Aggregates/Hydrocarbons has been “cleaned” as part of work for EDITO and will be republished on portal in Q1 2025 – simplifying the layers on the portal for marine aggregates and marine hydrocarbons. As part of the Trondheim project meeting, a WP7 workshop was held to discuss the classification of marine aggregates with project team. The meeting made significant progress on the issue.

WP8 – Submerged landscapes. All project organisations are now using the new WP8 templates for any new WP8 data submissions – although no new data has been received this quarter. All existing WP8 data layers have been converted into the new formats and all appropriate metadata completed. Symbology for all data layers has also been refreshed. The new data layers are now on the Central Portal.

WP8 leaders presented progress at the project meeting in Trondheim and provided guidance and assistance to team members in use of the new task guide and helped correct any data errors.

All issues identified by EDITO have been resolved with the new data release. These included metadata and errors to feature geometry and coordinate systems.

WP9 – Data management, web portal and services. As explained under task 4, WP9 has been busy implementing updates from WP4 Seafloor geology, WP5 Coastal Behaviour, and WP8 Submerged landscapes. The new metadata flow has also been put into production. This has resulted in more information being included in the metadata descriptions - including information about licences and constraints on data.

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
M1: Evaluation of the progress	WP9, all WP's	October 2024	Delivered	5-7.11.2024, This report	First year progress was evaluated during the project meeting in November 2024.
M2: Data specification and sourcing ready	All WP's	June 2025	To do		
M3: Thematic data products updated on CP	WP1&WP9	24.9.2025	To do		
D1.1-8: Quarterly reports 3/2023, 4/2023, 1/2024, 2/2024, 3/2024, 4/2024, 1/2025, 2/2025	WP1/all	15.10.2023 15.1.2024 15.4.2024 15.7.2024 15.10.2024 15.1.2025 15.4.2025 15.7.2025	Delivered Delivered Delivered Delivered Delivered This report To do To do	13.10.2023 15.1.2024 15.4.2024 12.7.2024 15.10.2024 15.1.2025	
D2.1: Interim report (36 months)	WP1/all	24.9.2024	Delivered	1.10.2024	
D2.2: Final report (48 months)	WP1/all	24.9.2025	To do		
D3.1: First data products/maps updated on Central Portal	WP9/WP1/all	January 2025	Delivered	December 2024	
D3.2: Final data products/maps available	All WP's	24.9.2025	To do		

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
EM-85 - Geology - Web Services MetadataUrl and DataUrl fields	Resolved	Ongoing monitoring by the Central Portal. No further action is needed		
EM-142 - Geology Quality of Service Monitoring	Resolved	Ongoing monitoring by the Central Portal. No further action is needed		
EM-525 - Updating of EMODnet Geology - Seafloor Geology layers in the European Atlas of the Seas	Pending	This ticket is currently assigned to the Central Portal.		
EMODNET-1643 - Coordinate axis order in your metadata	Resolved	We've changed the dataflow, and the problem is solved.		
EM-957 - EMODnet lots to check if filter values are displayed in the preferred order	Resolved	Filter values have been checked by all organisations in the geology consortium		
EM-1008 - Geology to review the guidelines document on metadata harmonization	Resolved	It was checked that all changes proposed in the document could be handled by the metadata editor used by geology	08-11-2024 00:00	
EMODNET-1746 - FW: Geology WMS Connection	Resolved	This error occurred during the adjustment of the metadata flow for geology		

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
EM-799 - Diagram that shows the position of the shoreline through time	In Progress	This is a suggested new feature, and no deadlines are specified yet		
EM-935 - New csw end point for geology	Resolved	The new flow of metadata has been implemented.		
EM-1031 - updates to EMODnet Geology Submerged Landscapes	Resolved	The data in this work package was updated and restructured, making changes in the map viewer necessary.		

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
EM-1036 - New layer for Geology Coastal behavior	In Review	The layer, Coastal Resilience and Vulnerability, was deployed in the development map viewer and tested thoroughly. The work package leader wanted to wait with the launch until the beginning of 2025.		
EM-1037 - Corrections of metadata link for geology in web map viewer	Resolved	Unfortunately, the new flow of metadata meant that the id of the metadata sets was changed, which also meant that the link in the web map viewer had to be changed.		
WP5: Replace red-yellow-green with shades of blue to move away from intuitive good/bad in WP5 migration products. This is also a better approach for color blinded users.	Resolved for Coastal Resilience, pending and in progress for Coastline Migration	Scripted for Coastal Resilience so that it can easily be implemented in Coastline Migration data products, with deliveries distributed over Q1 and Q2 of 2025.		
WP6: Difficulty of harmonization of data from neighboring areas, due to the high resolution of data gathered in recent years	Resolved	Promote geographic focus groups to tackle issues and find shared solutions	31/12/2024	06/11/2024
WP6: Information contained in the attribute tables are not always displayed correctly	Resolved	Check all WP6 layers and shapefiles to find a solution	31/10/2024	20/12/2024
WP8: Identified issue (projection) with WP8 database – some data not displayed/downloadable on portal.	Resolved	Data expert @BGS to rectify, liaising with WP9 & project team to rectify.	30/11/2024	30/11/2024
WP3: Misunderstanding between two project organisations with the sedimentation rates and seabed substrate data delivery.	Pending	The project organisations will discuss and work together for the next data delivery.		
WP7: Metadata issues for WP7 links from EGDI to EMODnet Portal	Pending	Review in place and being addressed	01/03/2025	

3. Communication assets

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	
October 2024	Paper	Novak, A., 2024. Paleocoastline modelling – What a difference a few meters of sediment make? Quaternary International, Issue 706, p. 49-59.		https://doi.org/10.1016/j.quaint.2024.07.005 .	Yes	
November 2024	Paper	Moses, C.A., 2025. Rock coast geo model: process-response dynamics, resilience and vulnerability. Geological Society, London, Engineering Geology Special Publications, 30(1), pp.egsp30-2023.		https://doi.org/10.1144/egsp30-2023-32	Yes	
Accepted – it will be put online the day the data product is released on the Central Portal	Paper	Moses, C., Butterill, C., Van Wingerden, E., Chopra, T., Humphries, A., Follows, S., Jones, L., Weil, M., Van Heteren, S. (2024). EMODnet Geology: pan-European assessment of coastal resilience and vulnerability. Quarterly Journal of Geohydrology and Engineering Geology.			Yes, upon publication	

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
October 2024	Abstract book	Medialdea et al. 2023. Atlas of Active Seabed Fluid Emissions along the Spanish Continental Margin, Abstract Book 15th Gas in Marine Sediment Conference			Yes (https://www.gims15.com/)
November 2024	Scientific Session	EGU 2025 Session accepted: Anu Kaskela, Kristine Asch, Anett Blischke, Marco Pantaloni: "Geological Mapping in Extreme Environments!"	November 2024	Scientific Session	
18.11.2024	News, Geological Survey of Norway	Stort europeisk samarbeid om marine geodata	Interview, EMODnet Geology project meeting	https://www.ngu.no/nyheter/stort-europeisk-samarbeid-om-marine-geodata	Yes
28.11.1014	Newsletter	EMODnet Geology meeting in Trondheim, Norway	Public dissemination, EMODnet Geology project meeting	https://emodnet.ec.europa.eu/en/emodnet-geology-meeting-trondheim-norway	Yes
December 2024	Story map	Asch, K., Müller,A., Blischke,A., Erlendson, Ö., Miesner,B., Müller,A. and Weidmann, J. (2024); EMODnet geology: Finding and compiling spatial data of the seafloor			Yes

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
19.12.2024	Newsletter	EMODnet updates its Seafloor geology and Submerged Landscapes map layers	Public dissemination, EMODnet Geology product updates	https://emodnet.ec.europa.eu/en/emodnet-updates-its-seafloor-geology-and-submerged-landscapes-map-layers	Yes

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

4. 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	n/a	For geology “data products” and “data” are about the same. Users download data as a zip-file that contains all layers from the sub-theme but otherwise we do not combine data or recalculate data to create new products. The statistics for “data products” and “data” is the same. Geology has only reported the statistics for “data products” in the former reports. To keep continuity this is also the case here.
What is your opinion on the data coverage within EMODnet for your thematic?		
B) Usage of data in this quarter	n/a	This is described under usage of data products
2. Current status and coverage of total number of data products A) Volume and coverage of available data products	ArcGIS	No major changes since last quarter. The WP4 data products updated during Q4/2024 did not include new area extensions and therefore the indicator has remained about the same.
B) Usage of data products in this quarter	Log from web server	The increase compared to the last quarter for WMS calls and downloads occurred especially in the period from October 10 to November 6. Some of this can be explained by the EMODnet Geology project meeting on November 5-7.
3. Internal and external organisations supplying/approached to supply data and data products within this quarter		No change since last report.
5.1 Daily number of page views of EMODnet Thematic entry page	Europa Analytics	There is a declining trend at the end of the year, this partly coincides with the time of Winter holiday.
5.2 Quarterly total number of visitors, page views, unique page views and percentage of returning visitors	Europa Analytics	There is a declining trend at the end of the year, this partly coincides with the time of Winter holiday.

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

5. Annex: Other documentation attached