



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 (Q1/2025)

Reporting Period: 01/01/2025 – 31/03/2025



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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 EMODnet 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. During Q1/2025, a new EMODnet Geology data product on Coastal Resilience was released. Marine Aggregates, Marine Hydrocarbons and Hydrates under Minerals, have been updated and the menu in the map viewer has been changed. Also, the layer General Physiographic Features has been 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 EMODnet Portal. 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 EMODnet Portal to have our data products available to any desired spaces there. During this reporting period, EMODnet Geology has published its first StoryMap on its thematic pages. The portal's partnership page was also examined for EMODnet Geology organisations and updated where necessary.

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 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. This quarter, there have been brief outages due to network restructuring. On February 11th, from 15:45 to 21:45, there were issues with GeoServer. Subsequently, more memory and disk space have been allocated to the machine. 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 EMODnet Geology Portal is now closed. 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 and/or representatives have actively participated in several EMODnet-related online meetings and workshops, e.g.: DG MARE-CINEA-EMODnet meeting (31.1.25) and GTT meeting (27.2.25). The Coordination also participated in European Ocean Days held in Brussels (7.2.2025). The Geology coordination has collaborated with other EMODnet thematics and Secretariat to prepare a collective response to the European Oceans Pact call for evidence. Furthermore, the team has contributed to an internal mapping exercise on Existing AI-related initiatives.

During this reporting period, the EMODnet Geology Steering Group (SG) held two online meetings. Topics included planning of the next project meeting, communication activities and technical issues among others. A bilateral online meeting between EMODnet Geology SG and EDITO took place March 27, 2025.

Personnel issues include the retirement of the deputy coordinator and former project coordinator at the end of March 2025.

EMODnet Geology has published a use case from Portugal and several news stories (see Table 3.B). Additionally, a blog titled [“Edge Hill University partners with EMODnet Geology to advance coastal resilience and vulnerability knowledge - The Knowledge”](https://blogs.edgehill.ac.uk/theknowledge/2025/03/12/edge-hill-university-partners-with-emodnet-geology-to-advance-coastal-resilience-and-vulnerability-knowledge/) was published by Edgehill University (12.3.2025) (<https://blogs.edgehill.ac.uk/theknowledge/2025/03/12/edge-hill-university-partners-with-emodnet-geology-to-advance-coastal-resilience-and-vulnerability-knowledge/>).

EMODnet Geology was well presented at the IODC-III in Columbia on March 10-11, 2025, with an onsite oral presentation titled “Marine Geological Data Exchange and Mapping of the Caribbean Sea in the EMODnet Geology project” (Salazar Ortiz et al., 2025) and an online poster titled “EMODnet Geology: Compiling Marine Geological Data Sets to support sustainable development of marine areas” (Kaskela et al., 2025). The project was also presented at the 10th FINMARI Researcher Day, Helsinki, Finland (4.3.25) as well as at the GeoDays conference in Oulu, Finland (11-13.3.15).

Several abstracts describing EMODnet Geology and its products have been submitted to international conferences, including EGU2025, the Baltic Sea Science Congress, and GeoHab 2025. Additionally, a scientific session “ESSI4.5: Geologic Mapping in Challenging Environments: from Ocean Floors to Outer Space”, co-convened by the Geology coordinator and WP4 leader, was accepted for EGU 2025 and will include multiple presentations from the EMODnet Geology team.

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 end the end of the renewal phase by September 24, 2025.

One of the highlights of this reporting period was the release of a new coastal resilience/vulnerability data product on the EMODnet Portal in February. This release was supported by a synchronously published article explaining the product in the EMODnet Special Issue of the Quarterly Journal of Engineering Geology and Hydrogeology.

The II EMODnet-Geology meeting of the Caribbean Working Group was held in San José (Costa Rica) on 27-31 January 2025. The meeting was organized by the Instituto Geológico y Minero de España (IGME), which act as the Caribbean Sea subtask leader, and the Directorate General for Geology and Mines and was supported by the Association of Iberoamerican Geological and Mining Surveys (ASGMI). Delegates from the geological surveys of Colombia, Guatemala, Cuba, Costa Rica, Mexico, and the Dominican Republic participate in the meeting. In addition, the Director of the Servicio Geológico Colombiano (Geological Survey of Colombia) and the President of ASGMI attended the meeting. The objective of the meeting was to elaborate the Geomorphological and the Physiographic maps and the PreQuaternary and Quaternary Geological Maps of the Caribbean Sea.

The individual data deliveries to the WP leaders for quality check and compilation have been included in the Indicator 3 of the Excel file.

WP3 – Seabed substrate. Overall, eight organisations have delivered seabed substrate at 5k, 10k, 20k, 50k, 100k and 1M scales (Black Sea, Baltic Sea, Caribbean Sea, Celtic Sea, Adriatic Sea, Faroe Islands, Greater North Sea and Norwegian Sea) during Q1/2025. Additionally, some metadata was updated and small corrections made at different scales. The WP3 lead organisation participated in the GeoDays 2025 Conference, Oulu, Finland and gave two EMODnet presentations (Kotilainen et al. 2025 and Kaskela et al. 2025). A bilateral meeting between WP3 leader Geological Survey of Finland and Geological Survey of Sweden was held to discuss about modelled seabed substrate data (18.2.25).

WP4 – Seafloor geology. Two organisations delivered data during the first quarter of 2025. WP4 has continued its efforts to provide a first draft of the vocabulary of marine geomorphology, focusing on the correct classification, hierarchical relations of the terms and their definitions. WP 4 has harmonised data within the “General Physiographic Features” layer from France and Spain in the Bay of Biscay. These data have been published at the EMODnet Central Portal. Additionally, WP4 has updated and published layers of geomorphology, pre-Quaternary geology, and Quaternary geology on the EMODnet Portal, as communicated in the EMODnet Newsletter.

In terms of outreach, a WP 4 storymap on marine geological mapping, authored by Asch, K., Müller, A., Blischke, A., Erlendson, Ö., Miesner, B., Müller, A., and Weidmann, J., was published on the EMODnet Central Portal and advertised in the EMODnet News digest (March 2025). WP 4 also initiated and submitted a scientific session for EGU 2025, which was accepted and merged with another session. The merged session titled “ESSI4.5: Geologic Mapping in Challenging Environments: from Ocean Floors to Outer Space” is convened by Frigeri, A., Kaskela, A., Asch, K., Iqbal, W., Rasmussen, M., and Klump, J. WP 4 will present a poster titled “EMODnet Geology and Data Harmonisation: Seafloor Mapping of the Western Baltic Sea,” authored by Müller et al.

WP5 – Coastal behaviour. WP5 released a new coastal resilience/vulnerability data product (Fig. 1) at the start of February 2025 (<https://emodnet.ec.europa.eu/en/new-emodnet-geology-coastal-resiliencevulnerability-data-product>). An explanatory article has been published, Gold Open Access, in the EMODnet Special Issue of the Quarterly Journal of Engineering Geology and Hydrogeology (<https://www.lyellcollection.org/doi/full/10.1144/qjgegh2024-119>). The paper release was synchronised with

the release of the data product and a link to the paper is provided in the product metadata. A book chapter, highlighting the EMODnet Geology suite of coastal behaviour data products has been published, also Gold Open Access, in an Engineering Geology Special Publication of the Geological Society of London (<https://www.lyellcollection.org/doi/full/10.1144/egsp30-2023-32>). Additionally, WP5 abstract 'EMODnet Geology: communicating pan-European coastal behaviour' has been accepted for oral presentation at the International Rock Coast Conference (<https://irc2025.units.it/schedule.html?v=1743765274536>).

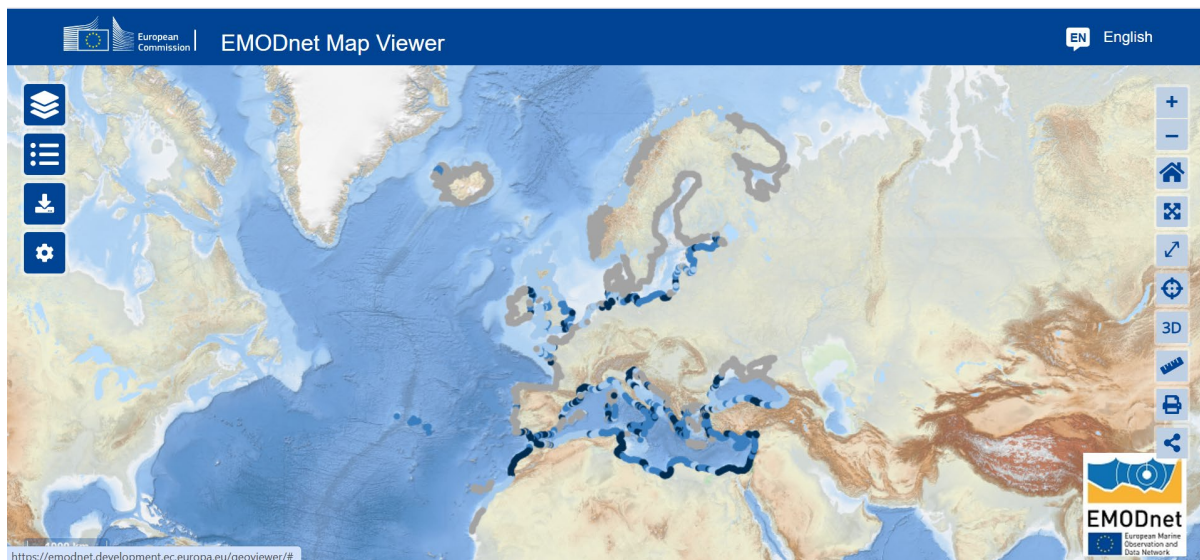


Figure 1. Coastal resilience/vulnerability data product in Central Portal test map viewer

Work for the Coastal Migration from satellite data and also field data has commenced 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 is being investigated. For the field data product, there are investigations into upgrading the shoreline to a more recent/detailed version.

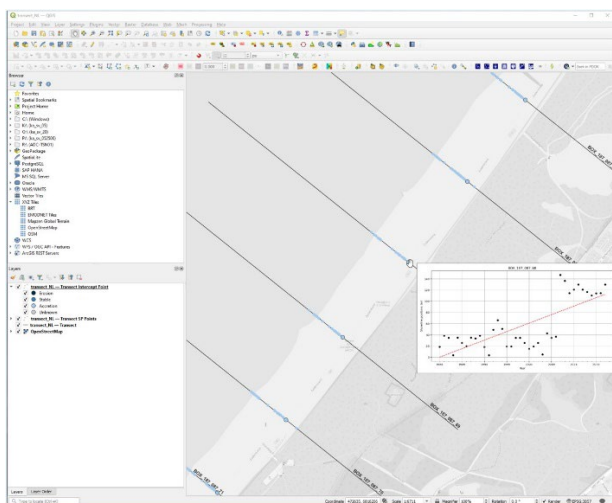


Figure 2. Coastline migration data product is in preparation.

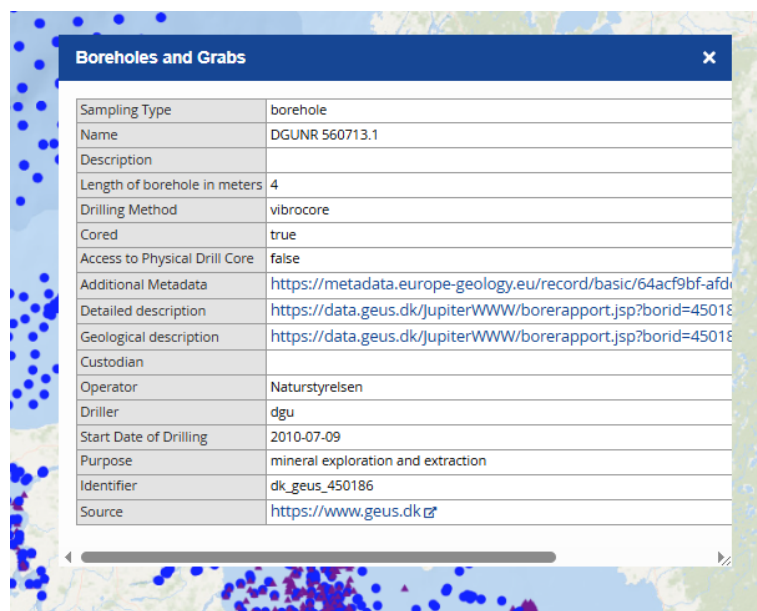
Some efforts have been made into upgrading the used coastline for the data product Coastal Migration from field data. The coastline used for this product doesn't fully represent the proper coastline geometries and in places it is also shifted, likely due to coordinate transformations. First attempts show that a new coastline can be implemented, but the transfer of classes from the original coastline can be a bit tricky. In some places, where the coastline geometry gets substantially more complex (e.g. due to a harbour or a coastal inlet), the original classes are not transferred with ease.

WP6 – Geological events and probabilities. New data and updates received during the current phase have been included into WP6 layers. Exchanges with team organisations have been necessary to solve a few inconsistencies. Subsequently, harmonization was performed; updated layers are going to be shared with team members for their validation. Additional issues concerning metadata had to be solved according to the new guideline created by the EMODnet Secretariat. A meeting was held with the EDITO team to clarify some issues. After that, ARCO variables for WP6 were provided to the EDITO team.

WP7 – Minerals. During this reporting period WP7 published the revised Marine Aggregates and Hydrocarbons data using sub deposit type as the main display attribute (removing the basic marine aggregate/hydrocarbons) in order to reduce duplicate data layers on the portal. WP7 has further worked to enhance the compatibility of WP7 data with EDITO. WP7 did not receive new data in Q1 2025.

WP8 – Submerged landscapes. During this quarter, WP8 has been working specifically on its metadata to improve its compatibility with the new metadata guideline of the EMODnet Secretariat. New WP8 templates have been provided to the project team for the submission of new data, however WP8 has not received any new data during this period.

WP9 – Data management, web portal and services. Initiated by Jira ticket EM-1074, the various work packages within EMODnet Geology have started updating our metadata. We needed to add additional information to the distribution section of the metadata description. We expect to complete the update at the beginning of April. The HTML output format for getFeatureInfo has also been changed to match the style used by EMODnet Human Activities (fig. 3). Previously, we used the default HTML format.



Boreholes and Grabs	
Sampling Type	borehole
Name	DGUNR 560713.1
Description	
Length of borehole in meters	4
Drilling Method	vibrocore
Cored	true
Access to Physical Drill Core	false
Additional Metadata	https://metadata.europe-geology.eu/record/basic/64acf9bf-afdc-4b3a-8000-000000000000
Detailed description	https://data.geus.dk/JupiterWWW/borerapport.jsp?borid=450186
Geological description	https://data.geus.dk/JupiterWWW/borerapport.jsp?borid=450186
Custodian	
Operator	Naturstyrelsen
Driller	dgu
Start Date of Drilling	2010-07-09
Purpose	mineral exploration and extraction
Identifier	dk_geus_450186
Source	https://www.geus.dk

Figure 3. An example of the new styling of the HTML output format for getFeatureInfo that is visible in the EMODnet Portal.

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, Q4/2024 report	
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 Delivered This report To do	13.10.2023 15.1.2024 15.4.2024 12.7.2024 15.10.2024 15.1.2025 15.4.2025	
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			23-01-2025
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.		

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-1042 - Creating a list of new features for the next release of MapViewer	Resolved		27-01-2025	27-01-2025
EM-1048 - Broken metadata and download links in the EMODnet viewer	Resolved			28-01-2025
EM-1074 - Geology to provide deadline by when metadata records can be adapted to meet the guidelines.	Resolved			24-02-2025

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-1036 - New layer for Geology Coastal behavior	Resolved			10-02-2025
EM-1064 - Update of info text in the map viewer under Geological events and probabilities	Resolved			14-02-2025
EM-1068 - Incorrect legends for mineral layers	Resolved			11-02-2025
EM-1098 - refresh of cache for General Physiographic Features	Resolved			01-03-2025
EM-799 - Diagram that shows the position of the shoreline through time	Pending	This is a suggested new feature, and no deadlines are specified yet		
EMODCOM-189 - EMODnet Geology member list update	Resolved			28-02-2025
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.		

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
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 EGD to EMODnet Portal	Resolved	Related to ticket EM-85 (resolved)	01/03/2025	23-01-2025
WP3: Missing information in 1M data, data was not shown CP mapviewer correctly if filtering option was used	Resolved	Missing attributes were filled, updated data was uploaded to portal		4.2.2025
WP3: Small error in the sedimentation rates legend at the Central Portal	Resolved	New legend picture uploaded to portal		9.3.2025

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
March 2025	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://www.lyellcollection.org/doi/full/10.1144/egsp30-2023-32	Yes
March 2025	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, volume 58.		https://www.lyellcollection.org/doi/full/10.1144/qjegh2024-119	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
	Conference proceedings	A.T. Kotilainen, A.M. Kaskela, S. Kihlman, M.M. Kotilainen, M. Moros, M. Sahiluoto, 2025. Mapping the seabed sedimentation rates – the winds of change also on the seabed? In: Pertti Sarala & Tiina Eskola (Eds.): Abstracts of the 3 rd GeoDays, 11 th – 13 th March 2025, Oulu, Finland. Proceedings of the Geological Society of Finland, vol. 5, p. 18. (Oral).			Yes (will be online soon)
	Conference proceedings	A. M. Kaskela, S. Kihlman, A. T. Kotilainen, EMODnet Geology Consortium, 2025. The European Marine Observation and Data Network (EMODnet) and advancing Marine Geoscience. In: Pertti Sarala & Tiina Eskola (Eds.): Abstracts of the 3 rd GeoDays, 11 th – 13 th March 2025, Oulu, Finland. Proceedings of the Geological Society of Finland, vol. 5, p. 48. (Poster).			Yes (will be online soon)
10.3.2025	Oral presentation, Conference proceedings	Edward Salazar Ortiz et al., 2025. MARINE GEOLOGICAL DATA EXCHANGE AND MAPPING OF THE CARIBBEAN SEA IN THE EMODnet- GEOLOGY PROJECT. IODC-III, Santa Marta, Colombia, 10-11.3.2025. (https://oceandataconference.org/iodc-iii-programme/)			Yes
10.3.2025	Poster presentation, online, Conference proceedings	Kaskela, A. et al., 2025. EMODnet Geology: Compiling Marine Geological Data Sets to support sustainable development of marine areas. IODC-III, Santa Marta, Colombia, 10-11.3.2025. (https://oceandataconference.org/postersession-iodc3/)			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.
B) Usage of data products in this quarter	Log from web server	The increase in WMS calls is primarily due to additional traffic from CloudFerro in Poland. There is a significant decrease in downloads. This can partly be explained by an increase in downloads in the last quarter. The usage of WFS continues the fall from last quarter. The reason for this is unknown.
3. Internal and external organisations supplying/approached to supply data and data products within this quarter		No significant changes since the last report. The Cuban data was delivered through Caribbean working group led by IGME.
5.1 Daily number of page views of EMODnet Thematic entry page	Europa Analytics	The numbers are about the same as last quarter.
5.2 Quarterly total number of visitors, page views, unique page views and percentage of returning visitors	Europa Analytics	No changes compared to the last quarter.

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