EMODnet

European Marine Observation and Data Network

EMODnet Thematic Lot 2 - Geology

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

Start date of the project: 25/09/2021 - (24 months)

EMODnet Phase IV – Quarterly Progress Report 2/8 (Q4/2021)

Reporting Period: 01/10/2021 – 31/12/2021

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Contents

Disclaimer

1. Highlights in this quarter

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

The EMODnet Geology partners started their project work with identification of new data. Work on collection and harmonisation of new datasets and first deliveries to the different work packages are mainly scheduled to begin in Q1 or Q2 of 2022, but deliveries continue until the end of the project. During Q4 2021 new datasets were submitted to WP8 from 4 partners and data updates from 2 partners.

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:

All data submitted by the partners will be added to the different data products and will be updated on the web portal.

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, WFS, and CSW. All project partners can connect directly to the portal PostgreSQL-database and create advanced queries on the project's data products.

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

We have a fully maintained and developed web portal contributing with geological data, data products and content, ready for migration to Central Portal.

Task 5: Contributing content to dedicated spaces in Central Portal:

We have been working in close cooperation with the Central Portal in order to have our data as well as our portal ready for all necessary measures regarding migration of EMODnet Geology data and products to any desired spaces on the Central Portal.

Task 6: Ensure the involvement of regional sea conventions:

The RSC issue will be dealt with during this phase, mainly through the planned meetings between all EMODnet thematic lots and the RSC's, a forum which was dismantled some years ago.

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 in order to contribute to all joint EMODnet efforts on the implementation of EU legislation and broader initiatives for open data.

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

We regularly monitor and assess the running systems in terms of performance and quality of service. User feedback is handled and problems resolved within hours.

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

We will keep our thematic portal running for a maximum of six months from the start of the project, or in order to have it successfully migrated to the Central Portal even further as long as necessary, provided that this is requested by CINEA.

Highlights of the different workpackages:

WP1. Project Management. This phase of the EMODnet Geology project started on 25th September 2021. Workplans for the phase were finalised in good pace after that. In order to have activities discussed and decided upon a remote project kick-off meeting was held 11-12. October. During the meeting general work plans for the entire project and detailed activities for the next six to twelve months were decided upon. Thus, all partners and subcontractors were aware of the general roadmap for the entire project as well as the necessary activities during the next half year, which will be checked and updated at the next project meeting in May 2022. Methods of data delivery and deadlines have been disseminated to all partners. Work packages have checked their guidelines and task guides and updated them in case necessary. For the partners the main activities of this quarter were in identifying new data for this phase of the project.

WP2. Geological data specification and sourcing. This task was completed by month 3 as partners and subcontractors were at the kick-off meeting asked to identify new data and metadata, which now are in the process of being collected. Additional updates will be added during months 4-22 and used in final updates and/or new data products by end of phase IV.

WP3. Sea-bed substrate. In order to tackle the new task of this phase "*seabed sediment … erosion rate*" WP3 leaders sent out a "Seabed erosion" query to partners 27.10.2021.
WP3 has formed a subgroup for partners interested in the confidence of the modelled substrate data. The group will have its first meeting in early 2022.
WP4. Sea-floor geology. Two meetings to prepare focus on coastal ribbon with concerned WPS (WP 4,5,6) took place in November and December 2021 (see WP5 below).
WP5. Coastal behaviour. Data specification and sourcing: representatives of WP4, 5 and 6 held two preparatory meetings to ensure alignment of work and contributions on the coastal ribbon. Agreed steps include: a) creation of an inventory questionnaire on data, information and knowledge concerning the coastal ribbon (WP4: lithology; WP6: susceptibility to geohazards; WP5: direct or indirect interaction with evolution of coastline); b) inventory of relevant descriptive and explanatory attributes and available information plus corresponding scales; c) selection of information to be requested from partners per WP (for current phase); and d) formulation of guidelines and attribute tables per WP.
WP6. Geological events and probabilities. Two meetings with focus on the coastal ribbon in November and December 2021 (see WP5 above).

WP8. Submerged landscapes. WP8 received 4 new data packages from A.P. Karpinsky Russian Geological Research Institute, Geological Survey of Ireland, Norges Geologiske Undersøkelse and the Geological Survey of Cyprus covering parts of the eastern Mediterranean, Norwegian, North, Caspian and Celtic seas. Updates received from British Geological Survey, and the Geological Survey of Finland.

WP9. Data management, web portal and services.

In this quarter we provided statistics on monthly downloads and dealt with incoming JIRA issues, but our main focus is preparing for the portal migration taking place in March. The migration is being prepared in close cooperation with the Secretariat. We have split the task into four subtasks; Main portal (CMS), data product downloading, data dissemination on maps, and metadata handling. This work is on track according to JIRA (EM-394, EM-414, EM-415, EM-416, and EM-418). In this quarter we also dealt with the new security issue discovered in Log4j in December 2021 (JIRA EM-421). We analyzed all software exposed externally consulting security specialists from our IT supplier. We concluded that none of our software products were using Log4j in critical versions. In this quarter we also solved issues in the web services metadata and data URLs (JIRA EM-85), provided a complete data inventory (JIRA EM-321) and solved an issue with displaying two layers on the Atlas of the SEAS (JIRA EM-352).

Status of the Milestones and Deliverables listed in the workplan				
Milestone/Deliverable	WP	Date due	Status (Delivered/Delayed)	If Delayed: reason for delay and expected delivery date
M1. Data specification and sourcing ready	WP2	Month 3	Completed by month 3, additional updates during months 4-22.	
M1: data specification and sourcing on coastal ribbon	WP4-6	25/09/2022	On schedule (action plan made)	
M2: Web portal updated T0+3 months	WP9	Month 3	Completed	
D 1.1 – D 1.6 (quarterly) Progress reports	WP1/all	M4, M7, M 10, M13, M16, M19	No reports delivered yet, this report is the first one.	
D3.1: First data products/maps updated	WP's 1-9	Month 3 + additional updates during months 4-22.	Delivery ongoing	First data products/maps were updated by partners for internal use and evaluation during M1-M3. Updates will be submitted according to schedule to WP leads and will later be gradually added to maps on portal.
D3.2. Seabed substrate information at a scale of 1:100 000 or more detailed from the European, Caspian and Caribbean Seas, final products.	WP3	24/09/2023		
D3.2. Seabed substrate information at a scale of 1:250 000 and 1: 1M from the European, Caspian and Caribbean Seas, final products.	WP3	24/09/2023		
D3.2. Sedimentation rates of recent sediments for the European, Caspian and Caribbean Seas as point data, final product.	WP3	31/07/2023		
D3.2. Erosion rates for pilot areas.	WP3	24/09/2023		
D3.2. Case study" Applying novel machine learning methods to expand sediment composition and sedimentation rate maps to new areas of the European continental shelf" published at the EMODnet Portal,	WP3	24/09/2023		

D3.1: updated and cross-validated GIS layers and WMS/WFS of coastal typology and behaviour information	WP5	25/03/2022	On schedule (new partner contributions are being provided)	
D3.1: new GIS layer and WMS/WFS on coastal resilience (including index map with available studies)	WP5	25/03/2022	On schedule (georeferenced map data are being digitized as attribute values)	
D3.1: v1 of open-access documentation addressing pan-European data products as well as case studies	WP5	25/09/2022	Not yet started	
D3.1: Guidelines for the current phase	WP6	01/03/2022		
D3.1: Inventory on availability of events probability data	WP6	01/06/2022		
D3.1: Partner data delivery	WP8	31.12.2021	First part completed, additional updates during months 4-22.	Received 4 completely new data packages from 4 partners covering parts of the eastern Mediterranean, Norwegian, North, Caspian and Celtic seas. Updates received from 2 partners.
D3.2 – WP8 first update delivered on Portal.	WP8	31/03/2022	In Progress	On schedule.
D3.2 – WP8 2nd update delivered on Portal.	WP8	10/10/2022	In Progress	On schedule.
D3.2 – Delivery of palaeogeographic reconstruction case studies on portal and at EGU 2023.	WP8	30/06/2023	In Progress	On schedule.
D8.4 – WP8 final update delivered on Portal.	WP8	24/09/2022	In Progress	On schedule.
D2.1 Interim report	WP1	Month 12	Not delivered, to be delivered 24.9.2022	
D2.2. Final report	WP1	Month 24	Not delivered, to be delivered 24.9.2023.	

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
Secretariat assessment: **Indicator 6:** *Published use cases: One new case study "Exploring the suitability of historic datasets to produce robust quantitative sediment maps." (case-study on quantitative spatial prediction of sediment distribution across selected sea-basins) was published on 24/09/2021. This is not mentioned in the table of indicators (Indicator 7), but it is mentioned in the WP3 update. Please update the table of indicators accordingly.*	Resolved, no actions	The case study is part of WP3 task "seabed substrates" described in our technical tender and it is not a use case with any third party involved. We had a similar case-study in the earlier phase and we have another in this phase, which will be published in the end of the project. No actions.		
Secretariat assessment: *Task 3: Develop procedures for machine-to-machine connections to data and data products.* ● *The 'Tsunamis Origin Points' and the 'Coast Affected by Tsunamis' layers in the EU Atlas of the Seas are broken because of updates to the origin layers in the EMODnet Geology portal. It is advised that in the future EMODnet Geology should implement a change control process, to inform known users of changes.*	Resolved, closed These have been repaired and JIRA ticket EM-352 closed. We await the Secretariat to decide on a change control process. Due to the GDPR it is difficult to contact users.			
Secretariat assessment: *Updated evaluation on the INSPIRE metadata and data URL issue for the Geology portal is provided in EM-14 - EASME - Action on Web Services MetadataUrl and DataUrl fields (21/11/2019)* *EM-85: Some of the Service Metadata URL's don't point to a*	resolved and closed			

valid Service Metadata XML document; *Several layers/feature types in the portal's view and download services have a metadata URL but while it advertised an XML format (required for machine readability), the link resolves in an HTML page.* *JIRA tickets EM-14 and EM-85*				

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
The ongoing spread of the Covid-19 virus all over Europe might affect the progress of the project, especially staying on schedule/meeting the deadlines.	Resolved (partly)	We organized the EMODnet Geology 5 kick-off meeting in October as a remote Teams-meeting		
WP6 lead has limited remote access to GIS resources	pending	Refurbishment of ISPRA office after extended fire	January 2022	
WP9. Splitting up boreholes into boreholes and grab samples	Pending. Rescheduled due to extra tasks in December (especially the Log4j security issue),	The borehole index will be split in at least two categories (boreholes and grab samples).	1.4.2022	
WP9. Splitting up geophysical index into seismic and multibeam	Pending. Rescheduled due to extra tasks in December (especially the Log4j security issue).	The geophysical index will be split in categories seismic and multibeam.	1.4.2022	

3. User feedback (Contact Us form, online chat & other communication means)

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
8.11.2021	WSP	Problems with with geo-package in accessing WP3 Seabed substrate data	email/portal	1 day	resolved	data distributed in other format (Esri Shapefile)	resolved
09 to 12.2021	TNO Acoustics & Sonar	Case study: Seabed-substrate type, the WP3 deliverable that is presently being used to assess underwater noise, is useful but a far better attribute for sandy seabeds would be grain size.	e-mail	1 day	Pending: grain-size information for Baltic Sea is being provided by partners separately.	As stated in the tender, WP5 will discuss and test median sand size describing the seabed surface, if deemed relevant to a wide range of users of the seabed environment. This message was conveyed to TNO Acoustics & Sonar.	There is no set deadline; EMODnet Geology partners are establishing a line of communication with the Acoustics research community, aiming for a use case.
1.10.2021	HCMR.gr	Invitation to conference	Email	1 hr	Resolved	Considered	

4. Meetings/events held/attended & planned

A. Meetings/events organised and attended					
Date	Location	Type event (internal or external meeting, training/workshop)	Indicate if a ppt was given (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
1.10.2021	Remote, Teams-Meeting	Internal EMODnet 5 Geology WP3, GTK Meeting	No	O	planning of the project kick-off meeting, 5 participants.
07.10.2021	videoconference	External meeting of institutions contributing to Italian WP6 deliveries (CNR-ISMAR, OGS, INGV, Universities of Genova, Palermo, RomaTRE and Trieste)	No	O	discussion on characteristics and quality of features at the scale of the current phase of the Project. 20 participants.
11.-12.10.2021	Remote, Teams-Meeting	EMODnet Geology 5 project kick-off Meeting. Internal.	Yes, several Work Package Presentations by the WP Leaders	O	Kick-off meeting of EMODnet Geology Phase 5: Overview of Project by coordinator Henry Vallius and each WP Leader. Discussions related to the plans and execution of EMODnet Geology 5, 60 participants.
18.-22.10.2021	Århus, Denmark	Baltic Sea Science Congress 2021. External.	Yes, oral presentation (Kotilainen et al. 2021), poster presentation (Kihlman et al. 2021)	A	dissemination of EMODnet Geology at BSSC 2021 conference, 180 participants.
03.11.2021	on-line	Internal meeting on coastal vulnerability	Yes, progress report	O	5 participants: strategy determined for conversion of georeferenced maps into digitized attributes (levels of vulnerability)
09.11.2021	The Hague, Netherlands	External meeting on seabed substrate and EMODnet	No	O	4 participants from the Royal Netherlands Navy (EMODnet Bathymetry) and TNO (EMODnet Geology): agreement updated on online accessibility of Dutch side-scan-

					sonar archive, first national (Dutch) interdisciplinary meeting on EMODnet discussed
11.11.201	on-line	WP 4, 5, 6 Internal meeting on Coastal Ribbon (1)		O	Discussion on how the coastal ribbon can be defined and how results can be achieved in the scope of phase V. Strategy determined for steps needed to ensure on-time delivery. 4 participants from WP 4, 5, 6.
18.11.2021	on-line	External webinar	Yes	A	EMSAGG webinar – 'Marine resource mapping in the UK and Europe'. Overview EMODnet Geology presentation in front of EMSAGG stakeholders.
24.11.2021	on-line	Internal meeting on coastal vulnerability	Yes, progress report	O	5 participants: status update and discussion of abstracts for EGU and IGU
09.12.2021	videoconference	External meeting of institutions contributing to Italian WP6 deliveries (CNR-ISMAR, OGS, INGV, ENEA, Universities of Genova, Palermo, RomaTRE and Trieste).	No	O	discussion on characteristics and quality of features at the scale of the current phase of the Project. 22 participants.
13.12.2021	on-line	WP 4, 5, 6 Internal meeting on Coastal Ribbon (2)		O	Presentation and discussion of first results of data analysis in large scale in Liguria and discussion of steps needed to ensure on-time delivery. 4 participants from WP 4, 5, 6.
14-18.12.2021	online	30th International Cartographic Conference. External.	Yes	A	Congress on all aspects of mapping and representation. 630 participants.
SUM				**O**	**Total # of meetings organised = 8**
SUM				**A**	**Total # of meetings attended = 3**

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
19.01.2022	On-line	Internal meeting on coastal ribbon	O	Coastal Ribbon 3rd meeting. Achieved results and next actions. Discussion on potential synergies concerning evolution of coastal areas, including on-land. Guidelines for partners needed to ensure on-time delivery.
19.01.2022	On-line	Internal meeting	O	First meeting of the WP 4 vocabulary group: cross-WP assessment of requirements for phase V,
26th January 2022	Online / Teams	Internal workshop	O	Workshop to discuss and identify the regional study areas to progress the palaeogeographic reconstruction element of the workpackage aims. Expected outcomes: 1) regional areas defined; 2) key partners identified to lead on those regional areas; 3) firm timeline and deliverables discussed.
01.02.2022	Videoconference	meeting of institutions contributing to Italian WP6 deliveries (CNR-ISMAR, OGS, INGV, ENEA, Universities of Genova, Palermo, RomaTRE and Trieste)	O	discussion on characteristics and quality of features at the scale of the current phase of the Project
Spring 2022	Online	EMODnet WP3 workshop on seabed erosion	O	Discussion on seabed erosion
17-19.5.2022	Utrecht, Netherlands	EMODnet 5 Project Meeting	O	Discussions on project progress and future steps

4-6.7.2022	Online / Teams / In Person To be decided	Conference	A	Abstract submitted (Title: "Submerged Landscapes Across European Seas") to the International Conference for Seafloor Landforms, Processes and Evolution. Opportunity to engage with wider community, gain feedback on products and source new data contributions.
TBD	TBD	Interdisciplinary workshop on EMODnet in the Netherlands	O	Higher visibility and more focused applicability of EMODnet in Dutch societal issues and questions

5. Communication assets

A. Communication products				
Date	Communication material	Short description (of the material, title, ...) of the asset	Main results	Name of event at which material was disseminated (if applicable)
October 2021	Oral presentation and abstract	Kotilainen, A.T., Kotilainen, M.M., Vartti, V.-P., Hutri, K.-L., Virtasalo, J.J., 2021. 137Caesium contents in the northern Baltic Sea sediments. In: 13th Baltic Sea Science Congress, 18-22, October 2021, Århus, Denmark: Abstract Book. 18. (Oral).	Public dissemination	Oral presentation at Baltic Sea Science Congress, 18-22, October 2021, Århus, Denmark
15.10.2021	Press release	EMODnet Geology Phase completion and WP summary results	Public dissemination	
October 2021	Poster presentation and abstract	Kihlman, S., Kaskela, A.M., Kotilainen, A.T., Alanen, U., Vallius, H., EMODnet Geology partners, 2021. Seabed substrate data of European Seas – EMODnet Geology. In: 13th Baltic Sea Science Congress, 18-22, October 2021, Århus, Denmark: Abstract Book. 118. (Poster).	Public dissemination	Oral presentation at Baltic Sea Science Congress, 18-22, October 2021, Århus, Denmark
18.11.2021	Oral presentation	EMSAGG webinar – 'Marine resource mapping in the UK and Europe',	Public dissemination	Introduce results to the marine aggregate community represented in the EMSAGG group
November 2021	Blog	Blog about 137Cs activity contents and sedimentation rates in the Baltic Sea sediments (in Finnish). "Vuoden 1986 Tšernobylin ydinvoimalaonnettomuuden jäljet näkyvät yhä Itämeren sedimenteissä" (Kotilainen, A.T.; Kotilainen, M.M.; Vartti, V.-P.; Hutri, K.-L.; Virtasalo, J.J.)" at GTK's webpage. https://www.gtk.fi/ajankohtaista/vuoden-1986-tsernobylin-ydinvoimalaonnettomuuden-jaljet-nakyvat-yha-itameren-sedimenteissa/	Public dissemination	Scientific publication in Marine Pollution Bulletin

23.11.2021	TV documentary	"Under the volcano", information on volcanoes in Italy, with a focus on submerged structures which have been inventoried for EMODnet Geology	dissemination	"Mompracem" TV documentary series

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

List of known publications using EMODnet data or data products				
Date	Type and name of journal, conference, …	Publication title including DOI (if known)	Author(s)	Organisation(s)
November 2021	Marine Pollution Bulletin	Chernobyl still with us: 137Caesium activity contents in seabed sediments from the Gulf of Bothnia, northern Baltic Sea. Marine Pollution Bulletin. 172. https://doi.org/10.1016/j.marpolbul.2021.112924	Kotilainen, Aarno T; Kotilainen, Mia M; Vartti, Vesa-Pekka; Hutri, Kaisa-Leena; Virtasalo, Joonas J	Geological Survey of Finland; Department of Geosciences and Geography, University of Helsinki; STUK-Radiation and Nuclear Safety Authority, Helsinki, Finland
November 2021	Front. Mar. Sci.	Sounding Out the Carbon: The Potential of Acoustic Backscatter Data to Yield Improved Spatial Predictions of Organic Carbon in Marine Sediments. https://doi.org/10.3389/fmars.2021.756400	Hunt, C.A., Demšar, U., Marchant, B., Dove, D., Austin, W.E.N.	School of Geography and Sustainable Development, University of St Andrews; British Geological Survey; Scottish Marine Institute
November 2021	A North Sea Wildlife Trusts, Blue Marine Foundation, WWF and RSPB commissioned report	Assessment of Carbon Capture and Storage in Natural Systems within the English North Sea (Including within Marine Protected Areas).	Burrows, M.T., Moore, P., Sugden, H., Fitzsimmons, C., Smeaton, C., Austin, W., Parker, R., Kröger, S., Powell, C., Gregory, L., Procter, W., Brook, T.	The Scottish Association for Marine Science (SAMS); Centre for Environment, Fisheries and Aquaculture (Cefas); Newcastle University; University of St Andrews
November 2021	Marine Geology	Carbon burial in the mid-latitude fjords of Scotland	Smeaton, C., Yang, H., Austin, W.E.N.	University of St Andrews; University College London; Scottish Association of Marine Science,
November 2021	Position Paper 26 of the European Marine Board, Ostend, Belgium. 100 pages.	Marine geohazards: Safeguarding society and the Blue Economy from a hidden threat. Muniz Piniella, A., Kellett, P., van den Brand, R., Alexander, B., Rodriguez Perez, A., Van Elslander, J., Heymans, J. J., [Eds.] DOI: 10.5281/zenodo.5591938	Kopp, H., Chiocci, F. L., Berndt, C., Çağatay, M. N., Ferreira, T., Fortes, C. J. E. M., Gràcia, E., González Vega, A., Kopf, A. J.,	GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany; University of Rome 'Sapienza', Italy; İstanbul Technical University, Turkey;

			Sørensen, M. B., Sultan, N., Yeo, I. A.	University of the Azores, Portugal; LNEC - National Laboratory for Civil Engineering, Portugal; ICM-CSIC - Institute of Marine Sciences, CSIC, Spain; IEO - Spanish Institute of Oceanography, Spain; MARUM – Center for Marine Environmental Sciences, University of Bremen, Germany; University of Bergen, Norway; IFREMER, France; NOC - National Oceanography Centre, UK.
27.11.2021	Published: Geological Society of London Special Issue: From Continental Shelf to Slope - Mapping the Oceanic Realm	A first approach to a Geomorphological Map of the German Seas GSLSpecPub2021-24	Breuer, Sonja*) & Asch, Kristine **)	*) Landesamt für Bergbau, Energie und Rohstoffe (LBEG) **) Bundesanstalt für Geowissenschaften und Rohstoffe (BGR), Hannover, Germany
16.12.2021	30th International Cartographic Conference	EMODnet Geology: digital geological maps of European seas	Fiorentino A., Battaglini L., Conti M., D'Angelo S. & Innocenti C.	AIC – Italian Cartographic Association ICA – International Cartographic Association
17.12.2021	30th International Cartographic Conference	CARG Geological Database: New Layers, New Data	Battaglini L. & Carta R.	AIC – Italian Cartographic Association ICA – International Cartographic Association

14-18.12.2021	30th International Cartographic Exhibition	Map of the Italian submarine volcanic structures (http://www.geografia-applicata.it/icc-2021-virtual-exhibition/)	Giordano G., Pensa A., Fiorentino A., Vita L. & D'Angelo S.	AIC – Italian Cartographic Association ICA – International Cartographic Association
14-18.12.2021	30th International Cartographic Exhibition	Atlas of Italian Submarine Volcanic Structures (http://www.geografia-applicata.it/icc-2021-virtual-exhibition/)	D'Angelo S., Fiorentino A., Giordano G., Pensa A., Pinton A. & Vita L. (Editors)	AIC – Italian Cartographic Association ICA – International Cartographic Association

Recommended Citation: Burrows, M.T., Moore, P., Sugden, H., Fitzsimmons, C., Smeaton, C., Austin, W., Parker, R., Kröger, S., Powell, C., Gregory, L., Procter, W., Brook, T. (2021) Assessment of Carbon Capture and Storage in Natural Systems within the English North Sea (Including within Marine Protected Areas). A North Sea Wildlife Trusts, Blue Marine Foundation, WWF and RSPB commissioned report.

6. Monitoring indicators

Comments on the progress indicators in the excel template		
Progress indicator	Means of collecting figures	Comment
1. Current status and coverage of total available thematic data A) Volume and coverage of available data **If you don't use the provided sea-basin figures, please indicate why you do not use them, as from when, and what do you use instead and why?**	Matomo/ other (Please state which monitoring tool was used to collate the information in each case)	We don't publish data with coverage, only point information on accumulation rate, no coverage.
B) Usage of data in this quarter		
2. Current status and coverage of total number of data products A) Volume and coverage of available data products **If you don't use the provided sea-basin figures, please indicate why you do not use them, as from when, and what do you use instead and why?**		There is no uniform digital definition (in GIS format) of the European sea areas and their boundaries used in the EMODnet Lots. Therefore EMODnet Geology has used its own Regions shapefile to assess the coverage of the products (maps) (WP3, WP4). The latest seabed substrate data update (21.9.21) includes 4 data products at different scales: 1:1 000 000, 1: 250 000, 1: 100 000 and multiscale. The multiscale data includes 11 layers at varying scales (1:70 000 – 1: 1500). The seabed substrate data at 1 M scale covers about 43 % of the Geology Regions, data at scale 250 k covers about 12 % and more detailed scales cover less than 5 %. The coverages by sea-basin are indicated in the excel file (Indicator 2). The last update of the seabed substrate data was in September 2021.
B) Usage of data products in this quarter		Map requests are implicit in WMS stats. We see a slight increase in usage per quarterly report except for a dip in December.

3. Organisations supplying/approached to supply data and data products within this quarter		No change since last report.
4. Online 'Web' interfaces to access or view data		No change since last report.
5. Statistics on information volunteered through download forms		Due to GDPR we do not register place of origin.
6. Published use cases		None in this reporting period.
8.1. Technical monitoring		Satisfactory both response time and up-time
8.2. Portal user-friendliness (Visual harmonization score)		73
9. Visibility & Analytics for web pages		We see a slight increase on all parameters except the contribute page which has moved to a less prominent location on the portal.
10. Visibility & Analytics for web sections		Previous trend continued, that users are more keen to accessing maps and downloads directly. This is a common trend to jump directly from Google to sub pages.
11. Average visit duration for web pages		The numbers show no clear trend for this reporting period. We are averaging on approx 1 minute per page view and 1 hr average per visit which can be seen as satisfactory.

The monitoring numbers reported as part of the progress monitoring of EMODnet performance are collected through Matomo. In some cases, numbers from other monitoring systems may also be reported (e.g. Awstats, Google Analytics), and if so, must be reported in the table above. Each system uses different technical approaches and therefore has its strengths and shortcomings. Therefore, results are indicative and care should be taken when interpreting absolute numbers or comparing results from different tools. It is often more sensible to consider trends over time collected by the same monitoring tool.

7. Annex: Other documentation attached

[List in Annex if you wish to provide any additional information.]