



## EMODnet Thematic Lot n° 1- Geology

EMODnet Phase III - Trimonthly Report

Reporting Period: 01/10/2017 – 31/12/2017

Date: 15/01/2018

EASME/EMFF/2016/1.3.1.2 - Lot 1/SI2.750862

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# 1. Highlights in this reporting period

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- The possibility to obtain seismic data from the EMSC database to WP6 has been explored. EMSC was contacted and data are now partly obtained from EMSC and partly from consortium partners.
- The portal layout, styling and colors are aligned with new guidelines from the EMODnet Secretariat.
- All data products are registered in relational database (PostgreSQL) for better supporting users preferring database environments. This way, users can more freely join data from various sources (data mashup).
- User activity now logged to central database (Piwik) hosted by EMODnet main portal.
- Good contacts and acceptance at the AGU Fall Meeting 2017, December. New Orleans, USA, as researchers from China, Korea, Australia and America expressed interest in the EMODnet Geology project, and specifically the WP7 Minerals framework.

## 2. Meetings held since last report

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Date	Location	Topic	Short Description
2 October 2017	SHOM, Athens	EMODnet Seabed Habitats – EMODnet Geology, co-operation between lots	EMODnet Geology coordinator and WP3 Leaders (GTK) participated in this co-operation workshop
27 October 2017	Rome	Meeting of the Italian Research Group contributing to EMODnet Geology (ISPRA, ENEA, ISMAR, OGS, Universities of Palermo, RomaTRE and Trieste)	Discussion on the next steps to be undertaken in order to provide data at the resolution required by the new phase of the Project, particularly regarding WP6.
06 November 2017	Skype	WP9 strategy and coordination, between partners GEUS and GeoZS.	Strategy and coordination of WP9 activities.
23 November 2017	SYKE, Helsinki	EMODnet Broad scale habitats.	Finnish/National meeting discussing EMODnet Broad scale habitats and HELCOM Hub classification

### 3. Work package updates

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#### ***WP1. Project Management (Geological Survey of Finland - GTK)***

The second trimonthly report, which was submitted to EASME, the Secretariat and DG MARE on October 13<sup>th</sup>, was accepted on 27<sup>th</sup> November, with some amendments for the next trimonthly reports, which were as follows; According to our first progress report (WP1) the agreements with BGR (Germany) and VSEGEI (Russia) were still pending signature. Agreements with these both subcontractors were signed during the second quarter, with BGR on 10<sup>th</sup> July and with VSEGEI on 16<sup>th</sup> August. Due to the delay in agreement there was lack in staff at BGR, but the problem has been solved during 3<sup>rd</sup> quarter: a GIS-engineer (1. December) and a marine geologist (1. January) were employed to BGR. VSEGEI didn't face such problems due to temporary budgetary funding for the project.

On 21 December 2017, EASME agreed to modify the service contract EASME/EMFF/2016/1.3.1.2 - Lot 1/SI2.750862 - Operation, development and maintenance of a European Marine Observation and Data Network - Geology such that "All references in the Contract to partner "Continental Shelf Department of the Ministry of Transport and Infrastructure (MRA)" are deemed to refer to "Continental Shelf Department, Office of the Prime Minister, Malta."

The regional sea conventions (RSC's) have been officially invited to our two project meetings, and a visit to HELCOM was planned for December. Unfortunately, the offer of introducing EMODnet Geology to HELCOM Secretariat did not succeed. New plans of marketing EMODnet Geology towards the RSC's is on the future agenda (see Appendix 1).

The "Geomorphology" working group (with members from WP3, WP4, WP5, WP6) met during the Geological Data Harmonization Workshop, which took place during the second project meeting in Rome (25 September 2017). The first step undertaken after that meeting has been to identify a vocabulary in agreement with INSPIRE and fulfilling the needs of each Partner and each WP. The approach is aimed at preventing duplication of terms and/or features across WPs.

#### ***WP2. Geological data specification and sourcing (Geological Survey of Finland - GTK)***

This work package was completed according to the project plan and the GANNT chart by month 3. Thus all available data is catalogued and available for the project. Although WP2 officially ended after 3 months of the project start, the process of identifying information that can be used in the EMODnet-Geology is ongoing and will continue until the end of the project.

### ***WP3. Sea-bed substrate (Geological Survey of Finland - GTK)***

In the 2<sup>nd</sup> workshop of the EMODnet 3 Geology in Rome September 2017 it was agreed that partners should use the original coastline of the data in their products/deliverables. The EMODnet 3 Geology WP3 leaders updated the WP3 Guidelines accordingly on 22 November 2017.

The EMODnet 3 Geology partners have continued their data harmonisation for WP3 deliverables according to the Guidelines. Partners have started to provide their harmonized seabed substrate data (on a scale of 1: 100 000 or more detailed) to the WP3 leaders.

### ***WP4. Sea-floor geology. (Bundesanstalt für Geowissenschaften und Rohstoffe – the Federal Institute for Geosciences and Natural Resources, Germany - BGR).***

Problem solved: the specific problem “Subcontract was signed late, so additional staff is expected to be employed by December 2017” listed in the last report was solved: a GIS-engineer (1. December) and a marine geologist (1. January 2018) were employed.

New vector and raster data received for the geomorphology, pre-Quaternary and Quaternary theme layers (see chapter 7)

All data are in the process of being assembled, checked, and – if necessary – modified according to the guidelines

### ***WP5. Coastal behaviour (Geological Survey of the Netherlands – TNO)***

Delft University of Technology/Deltares started working on a full-coverage pan-European coastline-migration analysis based on legacy and modern satellite data covering a 30-year monitoring period, which will be validated with EMODnet-delivered field data.

Received information from the first 25% of the partners on the following questions:

- Does your country have a national definition (formal or informal) of coastal resilience?
- Can you provide a list of national coastal hotspots designated to be at risk?
- Can you provide an Excel table with geological studies of your national coast?

It turns out that very few partners have a definition of coastal resilience, emphasizing the need for EMODnet to write a common one. Hotspots, easily mapped features with clear pan-European applied value, are also rarely mapped.

Many literature studies have been contributed, including hard-to-access national ones, and a start was made with entering the corresponding location outlines in ArcGIS, for an EMODnet data product that will be disseminated through a WMS.

### ***WP6. Geological events and probabilities (Istituto Superiore per la Protezione e la Ricerca Ambientale -ISPRA)***

The new WP6 Guidelines were distributed at the end of November 2017. Partners have been asked to deliver new shape files, where occurrences should be updated and detailed. The higher resolution of the products foreseen by the current phase of the project requires to provide more details (where available) concerning each occurrence.

The possibility to represent "geological events probabilities" is being explored. According to data available within EMODnet Geology, it was decided to adopt the definition of "Probability" as "Susceptibility". As described in the INSPIRE data specification on Natural Risk Zone, "Susceptibility" (also known as qualitative likelihood) is a descriptive assessment of the likelihood of occurrence of a hazard event. Susceptibility could be elaborated modelling the possible link among geological events occurrences and geo-morphological elements of the surrounding area. Now, this possibility is being explored for landslides.

A bibliographical review of the models used to elaborate susceptibility maps has been conducted. Morphometric maps of the European seas are being elaborated.

Currently we are testing different models, among which a model for landslide events, aiming to:

- identify which geo-morphological characteristics contribute to a higher probability of occurrence of the event
- use the characteristics identified to model the susceptibility of the seafloor related to the considered geological event

In order to consider characteristics related to earthquakes, an earthquake database is also necessary. Therefore, following contacts with the EMSC (European Mediterranean Seismological Centre), it was decided to create an additional earthquakes layer within WP6, differently from what had been done during the previous phases of the Project. A shape file format regarding earthquakes has been included in WP6 guidelines, in order to allow Partners to provide harmonized information as well as additional data, which are not reported on the EMSC website.

### ***WP7. Minerals (The Geological Survey of Ireland - GSI)***

All partners are tasked with mapping marine geological knowledge of 11 different types of marine minerals by collating information from all available national sources. Sub-classifications will be mapped for Aggregates and Hydrocarbons. We hope to receive information on quantitative and qualitative aspects of some mineral types so we can consider the possibility of producing resource maps.

It is anticipated that Digital Object Identifier (DOI) and Creative Commons (CC) licenses are to be assigned to the first iteration of data that will be published for EMODnet III Geology in the new year. This is subject to all partners gaining permission from their agencies. We have asked that all partners let us know whether legal issues prevent this before the new year. So far, no objections have been received.

We have also requested that partners QC data currently available. We have received some minor updates.

### ***WP8. Submerged landscapes (NERC-British Geological Survey - BGS)***

Data identification and compilation is proceeding in all the pilot areas of the UK Shelf, Baltic, Aegean, and Tyrrhenian seas, as well as offshore Ireland and in the Sea of Marmara.

Digitisation of available data is proceeding and feature shape files are being prepared.

An Excel Spreadsheet of the archaeological features identified under the COST action SPLASHCOS project has been compiled.

A generic excel spreadsheet has been compiled, for the submerged landscape features and palaeoenvironmental indicators identified in the EMODnet 3 Geology Technical tender, WP8 section.

A workshop to agree the draft guidelines for the submerged landscapes package, to be distributed to project partners at the end of the first year of EMODnet 3, has been organised for January 31st and February 1st in Crete.

### ***WP9. Data management, web portal and services (Geological Survey of Denmark and Greenland - GEUS)***

In this quarter, focus has been on coordinating our efforts on several levels. Firstly the EMODnet Secretariat are enforcing new guidelines on portal design, digital architecture, and reporting. Secondly all partners within EMODnet Geology are now asked to deliver data entity indexes for boreholes and

geophysics. This requires much support and assistance from WP9. Thirdly we divide the development in WP9 mainly between GeoZS (harvesting) and GEUS (architecture and development) thus requiring much coordination to have the best outcome. Lastly, many partners are heavily involved in related bilateral data projects with technical overlap like EPOS, EGDI and GeoERA.

Partners with borehole and geophysical indexes now share some or all their relevant data. Maturing access methods and further schema harmonization remains.

Regarding Tasks 1.4.1 of the tender Specifications, which concern WP9, see appendix 1.

### ***WP10. Dissemination (Geological Survey of Finland - GTK)***

Organizational changes in the communications team of the responsible partner GTK delayed some of the dissemination issues during the second quarter, but these were updated during the third quarter to follow set dissemination plans.

The EMODnet Geology consortium submitted several use cases to Trust-It in order to be evaluated for addition to the EMODnet annual Report of 2017.

### ***WP11. EMODnet collaboration (Geological Survey of Finland - GTK)***

The EMODnet Geology lot is actively communicating with other EMODnet lots, especially the Seabed Habitats lot, the Human Activities lot, the Data Ingestion project as well as the High Resolution Seabed mapping Project, with which cooperation plans have been drafted, agreed upon, and last time discussed at the 8th EMODnet Steering Committee meeting in Rome on 13-15.9.2017. Partners who are members in the EMODnet Seabed habitats lot and the High Resolution Seabed mapping project have participated in project meetings of the different lots and information has thus been exchanged between the EMODnet lots.

International collaboration or outreach in international seabed mapping “standards” has been an important issue of cooperation. Session proposals on this topic were by project partners submitted to three different important scientific meetings, and all of them were approved: The AGU 2017 Fall Meeting took place in New Orleans, Louisiana. 11-15. December 2017, where researchers from China, Korea, Australia and America expressed interest in the EMODnet Geology project and specifically the WP7 Minerals framework. They are to investigate the associated web links further.

Three other important meetings will be held during the first to third quarters of 2018; The 2018 Ocean Science meeting, 11-16. February, Portland, Oregon, the IUGS Resources for Future Generations Conference to be held on June 16-21, 2018 in Vancouver, BC, Canada, and the EMODnet approach will be marketed also at the GeoHab 2018 meeting, Santa Barbara, California, 7-11.5.2018.

***WP12. Project analysis and sustainability (Geological Survey of Finland - GTK and Geological Survey of Denmark and Greenland - GEUS)***

The analysis and report of this WP will be implemented during months 23-24, but issues regarding lessons learned will be collected during the entire project.

To ensure the sustainability of the EMODnet Geology project, EGDl provides an appropriate platform for developing a long-term infrastructure.

## 4. Specific challenges or difficulties encountered during the reporting period

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- WP6 Geological events and probabilities

WP6 Leader (Geological Survey of Italy) is carrying out testing of mathematical models to set a probability (aka susceptibility) analysis. The model identified will be successively discussed with Partners.

Many models have been applied to sub aerial landslides, but very few to submarine landslides. It will be necessary to adapt the sub aerial experience to the marine environment.

- Many morphometric maps have to be processed in order to investigate the possible links between morphometry and the occurrences of landslide as well as other geological events. Due to the extension of the area (European's seas), the production of these maps is challenging and time consuming.

- WP7 Minerals

20% of partners have made the deadline to provide new data, update their data or alert us of any changes to data. We understand this could be as a result of high demands on partners, a number of partners emphasised this fact during our last meeting. We will progress the update by adding new information received and hope partners will make another submission prior to our next project meeting.

The GSI has undergone structural and staff changes. This has resulted in the transfer of two key staff from the marine section. These staff enabled the transfer of merged WP7 data to WMS & managed the services. It is yet to be decided how the GSI will manage this temporary staff shortage

- WP9: Data management – web portal:

Data owners are still struggling with requirements for delivering their data entity indexes. We have now implemented the “maturity ladder” and data owners are now delivering preliminary data sets which will be analyzed in next quarter and a maturity strategy will be set in place.

The technological challenges within WP9 are still apparent. The cooperation with EPOS, EGDI and EMODnet main portal has been to great help.

## 5. User Feedback

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Date	Name	Organization	Type of user feedback (e.g. technical, case study etc.)	Response time to address user request
31.10.2017	*****	*****	Support: Problems with access to seabed substrate data	Corrected within 24 hrs
14.11.2017	*****	*****	Typo error on the portal	Corrected within 7 min
12.12.2017	*****	*****	Support: Problem accessing seabed substrate data via WMS in QGIS	Corrected within 25 hrs

Following presentation at the international meeting AGU Fall Meeting 2017, researchers from China, Korea, Australia and America expressed interest in the EMODnet Geology project and specifically the WP7 Minerals framework. They are to investigate the associated web links further.

## 6. Outreach and communication activities

Date	Media	Title	Short description and/or link to the activity
9 October 2017, Tallinn, Estonia	Gulf of Finland Trilateral Forum	<i>EMODnet Geology - geological data from the European marine areas</i>	Presentation by Kaskela, A. et. al.
30 November 2017, Helsinki, Finland	Gulf of Finland Trilateral (Russia – Estonia – Finland) Expert Group Meeting	Experiences of data harmonization and seabed substrate data harmonization process in the EMODnet Geology project	Presentation by Kotilainen, A. et. al.
07 November 2017, Dublin, Ireland	Geoscience 2017	'What geoscience is worth to you'	Information on the EMODnet Geology project & WP7 minerals
15-16 November 2017, Cork, Ireland	INFOMAR Seminar	The Irish National Seabed Mapping Programme	Information on the EMODnet Geology project & WP7 minerals
16 November 2017, Cork, Ireland	EMSAGG Workshop	European Marine Sand and Gravel Group (EMSAGG) Work Shop	Presentation of the EMODnet Geology project & WP7 minerals
30 November 2017, Helsinki, Finland	Gulf of Finland Trilateral (Russia – Estonia – Finland) Expert Group Meeting	Need for data harmonization in multinational marine areas. Experiences from the harmonization within geology (EMODnet, TOPCONS, Balance)	Presentation by Kotilainen, A., Kaskela, A., and Alanen, U.
8-9 December 2017 Lafayette, LA - USA	USGS-ISPRA bilateral meeting	Coastal change and events probabilities	Activities carried out by ISPRA concerning coastal changes within WP5 and WP6
11-15 December 2017 New Orleans, LA - USA	AGU 2017 Fall Meeting	Geological events in submerged areas: attributes and standards in the EMODnet Geology Project  Marine minerals	Presentation of the criteria and methods applied in the compilation of WP6 Information on EMODnet Geology & WP7 marine minerals

## 7. Updates on Progress Indicators

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### ***Indicator 1 - Volume of data made available through the portal***

- Seabed Substrates: Four layers totalling 106.499 features.  
Seabed substrate datasets (1 m & 250 k) from previous phases of EMODnet Geology are available through new/updated EMODnet II Geology portal
- Sea-floor Geology: One layer (four variations) totalling 7.754 features
- Coastal behaviour: Two layers totalling 137.679 features
- Events & Probabilities: 12 layers totalling 10.155 features
- Mineral occurrences: 14 layers totalling 12.199 features

No change since Sept 2017

### ***Indicator 2 - Organisations supplying each type of data based on (formal) sharing agreements and broken down into country and organisation type (e.g. government, industry, science)***

In the EMODnet – Geology technical tender chapter 5 members of the consortium have listed all the primary data, which is been made available for the EMODnet project according to the signed contract. The table was, updated during the three first months of the project. Additionally one of the six members of the consortium, that are not data suppliers to the EMODnet project, but will work on interpretations of coastal and marine data, mainly the submerged landscapes topic, has made available marine data for EMODnet - geology. In practice the European geological survey organisations (project partners) are in most cases administrators of the national geo data centres, so very few data are to be found outside the consortium. Those external sources, which might have additional data, are encouraged to submit their data through the EMODnet Data Ingestion portal or straight to EMODnet geology lot.

### ***Indicator 3 - Organisations that have been approached to supply data with no result, including type of data sought and reason why it has not been supplied***

- SeaDataNet has expressed willingness to give WFS access to their borehole and geophysics indexes but until now has only granted point search access via WMS requests. Reason unknown. Pending.

- In June talks, EMODnet Human Activities expressed willingness to harvest more attributes for their hydrocarbon boreholes (e.g. link to contact/download). A new harvesting is pending.

***Indicator 4 - Volume of each type of data and of each data product downloaded from the portal***

- Seabed Substrates: 3,740 MB  
 Seabed substrate datasets downloaded from GTK's Hakku service since September:  
 1:250 000 – Europe, 26 orders/downloads, 1:1 000 000 – Europe, 1 orders/downloads
- Sea-floor Geology: 423 MB
- Coastal behaviour: 344 MB
- Events & Probabilities: 462 MB
- Mineral occurrences: 105 MB

***Indicator 5 - Organisations that have downloaded each data type***

2017.09.23 Events & Prob.	*****
2017.09.25 Minerals	*****
2017.09.30 Coastal Behav.	*****
2017.10.10 Coastal Behav.	*****
2017.10.10 Events & Prob.	*****
2017.10.20 Events & Prob.	*****
2017.10.20 Minerals	*****
2017.10.24 Minerals	*****
2017.10.29 Minerals	*****
2017.10.29 Substrate 1M	*****
2017.10.30 Substrate 1M	*****
2017.10.30 Substrate 1M	*****
2017.10.30 Substrate 1M	*****
2017.11.02 Coastal Behav.	*****
2017.11.02 Sea-floor	*****
2017.11.03 Substrate 250k	*****
2017.11.04 Substrate 250k	*****
2017.11.04 Substrate 250k	*****
2017.11.07 Substrate 250k	*****
2017.11.07 Sea-floor	*****
2017.11.07 Sea-floor	*****
2017.11.07 Substrate 250k	*****
2017.11.08 Substrate 1M	*****
2017.11.08 Coastal Behav.	*****
2017.11.08 Substrate 250k	*****
2017.11.09 Events and Prob.	*****
2017.11.10 Coastal Behav.	*****
2017.11.10 Substrate 250k	*****

2017.11.13 Substrate 250k	*****	
2017.11.13 Substrate 1M	*****	
2017.11.13 Sea-floor	*****	
2017.11.14 Minerals	*****	
2017.11.14 Events and Prob.	*****	
2017.11.14 Coastal Behav.	*****	
2017.11.15 Substrate 250k	*****	
2017.11.16 Substrate 250k	*****	
2017.11.16 Substrate 1M	*****	
2017.11.17 Substrate 250k	*****	
2017.11.20 Substrate 1M	*****	“possibly in Species Distribution Modeling”
2017.11.20 Substrate 250k	*****	“MSFD maps”
2017.11.21 Substrate 250k	*****	
2017.11.21 Sea-floor	*****	
2017.11.22 Substrate 1M	*****	“Cross data with other habitat information of demersal species”
2017.11.22 Substrate 250k	*****	
2017.11.24 Substrate 250k	*****	
2017.11.29 Substrate 250k	*****	
2017.11.29 Sea-floor	*****	
2017.12.02 Substrate 250k	*****	
2017.12.05 Sea-floor	*****	
2017.12.05 Substrate 250k	*****	
2017.12.05 Substrate 250k	*****	
2017.12.05 Sea-floor	*****	
2017.12.05 Substrate 250k	*****	“presentation at AGU”
2017.12.05 Sea-floor	*****	
2017.12.08 Coastal Behav.	*****	
2017.12.08 Sea-floor	*****	“research, atlas project”
2017.12.11 Events & Prob.	*****	
2017.12.14 Substrate 250k	*****	“Seafloor mapping assignment”
2017.12.15 Substrate 250k	*****	“For drawing up a abiotic site characterization of Belfast Lough”
2017.12.15 Substrate 250k	r*****	“For an abiotic site characterization of Belfast Lough”
2017.12.15 Substrate 250k		“We would like to estimate the area of each substrate type on the Portuguese coast”

The mostly downloaded product is the Substrate 250k

***Indicator 6 - Using user statistics to determine the main pages utilised and to identify preferred user navigations routes***

Period: 2017.09.27 – 2017.12.14

- 1,253 visits

- 3min 58s average visit duration
- 33% left the website after one page
- 3.8 actions (page views, downloads, outlinks and internal site searches) per visit
- 4,142 pageviews 3,002 unique pageviews
- Referrer types: 509 websites, 224 search engines

From above we can conclude that users on average click 4 times on the portal before leaving again. We can assume they find the relevant content within four clicks, but to know for sure we would have to do user interviews.

### ***Indicator 7 - List of what the downloaded data has been used for (divided into categories e.g. Government planning, pollution assessment and (commercial) environmental assessment, etc.)***

We activated a comment possibility to the download form mid-November. Since then, 40% leave the field blank. 26% state educational or research, the final 24% are stated word-by-word in Indicator 5.

Regarding the substrate data usage has been reported as:

- e.g. Substrate info for Finnish navigational charts
- Scientific study
- Publication
- Academic dissertation, PhD study

### ***Indicator 8 - List of web-services made available and user organisations connected through these web-services***

We extended capabilities with WFS access. These services are yet not published to the broader public but were used for an educational “hackathon” with success.

### ***Indicator 11 - Relevant scientific and/or popular articles using /referring to EMODnet***

Kaskela, A., 2017. Seabed Landscapes of the Baltic Sea: Geological characterization of the seabed environment with spatial analysis techniques. Academic dissertation, Department of Geosciences and Geography, University of Helsinki. Geological Survey of Finland. 42 p.

## 8. Annex 1 - Progress of each of the tasks specified in Section 1.4.1., of the Tender Specifications

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### ***Task 1: Develop a common method of access to data held in repositories:***

In corporation with other EU projects (EGDI, EPOS, ProSUM), we develop and implement a common method of access to data held in locally distributed repositories. In EMODnet Geology, we are in the data discovery phase, where 28 partners have been asked to share descriptions (metadata) and spatial location of true ground samples and geophysical surveys. We now have 12 data sets ready for analysis and expect more data sets to be delivered within the first quarter of 2018. We are in dialogue with data managers in the EGDI, EPOS, and ProSUM to decide the best approach to have these data sets harmonised and make them seamlessly downloadable to users on request.

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

To allow users access more geological relevant data sets from within the portal, we added new external data sources to the map viewer under paragraph “Other Portals”; EMODnet Bathymetry, Geo-Seas, and Seismic Portal. Now, users can select between all free data layers available in these data sources.

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

All data products are listed on the “Products” page with links and examples to web services, data download and online Web-GIS. These options are by identified use-cases selected to be the most efficient way in helping users access our products and services, whether it is desktop GIS software, handheld devices, large-scale data projects or casual data browsing.

We are working on making our data products cover even more use-cases by allowing registered users online access to a read-only database (PostgreSQL). This approach is to our knowledge without

precedent but could for some users prove to be a highly efficient way to access and integrate EMODnet Geology data into their existing environment.

Regarding metadata, we have a running service (GeoNetwork) enrolled into nightly harvesting by EMODnet main portal and EGDI MICKA. This way, users browsing both EMODnet main portal and EGDI will easily discover our data products.

#### ***Task 4: Develop a web portal allowing users to find, visualise and download data:***

The web portal was constructed and up and running during the first three months of the project. We are continuously extending the functionality and usability of the portal. Data products are now well described and made easily available for both download, online map view, and as web services. On request, we can even offer users access to a PostgreSQL database where all data are available for SQL analysis. Most recently, we upgraded the layout and styling to align with the other EMODnet portals.

#### ***Task 5: Ensure the involvement of regional sea conventions:***

The three regional sea conventions (RSC's) have been officially invited to our two project meetings. The RSC's have not responded to the invitations so far, and the EMODnet geology decided to pay a visit to HELCOM. Thus, a promotional letter "Introduction to the EMODnet geology project" was sent to HELCOM secretariat on November 27th with an offer of visit such that EMODnet Geology could be presented to the HELCOM secretariat at their office. Unfortunately, this offer did not succeed. The coordination of EMODnet geology is now considering similar offers to the other RSC's. A visit to any interested RSC will be on the list for last quarter of this first year of the project or the first quarter of the second year.

#### ***Task 6: Facilitate interoperability with data distributed by non-EU organisations:***

An analysis on interoperability with data (standards and protocols) distributed by non-EU organisations is in progress. Now, we are co-operating with Geoscience Australia, and this issue will be discussed and further co-operation planned during the Resources for Future Generations conference, which will be held in Vancouver in June 2018. EMODnet Geology Consortium is together with Geoscience Australia having a session called "Marine Geoscience and Geospatial Data Crossing Borders" The main driver for this action is international collaboration between various sea-floor mapping programmes and brainstorming on a road map for future global seafloor mapping initiatives. We see that the European approach is best tested and well running, a single standard for one continent. Thus, co-operation with similar global initiatives is important at this moment, such that global standards and protocols in acquisition and processing of seafloor data into user-friendly products can be assured.

Partners of the EMODnet Geology consortium are participating in the Atlantic Seabed Mapping pilot, initiated by the Atlantic Seabed Mapping International Working Group (ASMIWG), which was established by the Trilateral Galway Statement Implementation Committee.

EMODnet Geology initiatives, methods and products have been presented at various international fora, such as the American Geophysical Union Fall Meeting (for a comprehensive list see paragraph 6. Outreach and communication activities), where good acceptance was gained from researchers from China, Korea, Australia and America, and future cooperation was discussed.

***Task 7: Install a process to monitor performance and deal with user feedback:***

We are now linked to a monitoring system hosted by the main portal (Piwik). Here we can login and extract performance and user statistics. The portal offer users the possibility to write feedback. We receive a few each month and answer within 1-2 working days in case of questions. We participate in all statistical initiatives put forward by the EMODnet Secretariat and Steering Committee.

***Task 8: Operate a help desk offering support to users:***

We continuously run our help desk according to rules set in the Tender Specifications. We receive on average four support questions per month which are handled within 1-2 working days.