EMODnet Thematic Lot n°5 - Chemistry

EASME/EMFF/2020/1.3.1.11/Lot 5/SI2.846161

Start date of the project: 03/10/2021 (24 months + 24 months)

Centralisation Phase

Quarterly Progress Report (11th)

Reporting Period: 01/04/2024 – 30/06/2024

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1. Highlights in this quarter

*[**List the quarterly progress for each of the tasks specified in Section 1.4.1 of the Tender Specifications**; provide an explanation for any tasks in which progress has not been noted. Provide in the table a list of **all** Milestones and Deliverables as from the technical workplan in numerical order, the date due, status and date delivered. Max 2 pages]*

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

EMODnet Chemistry uses the SeaDataNet infrastructure and standards to integrate and harmonise the marine chemistry datasets managed by its network of expert data centres (mainly NODCs). During the reporting period, 2,274 new datasets were added to the EMODnet Chemistry distributed CDI system, which manages eutrophication, contaminant and marine litter data. Several datasets were also reviewed and removed as part of the updating of the NODc's databases. At the same time, harmonised, standardised, and validated data are made available as regional collections for i) eutrophication (nutrients, chlorophyll and oxygen) and acidification (alkalinity and pH) in seawater, ii) contaminants in seawater, biota and sediments and iii) marine litter in seawater and sediments.

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

Following the two data harvests undertaken in the previous period, all six regional coordinators worked intensively on data aggregation and validation and met regularly to coordinate the process to produce the eutrophication and contaminants data products, i.e. regionally aggregated, validated and harmonised data collections for both substance groups, which were released in May 2024 (according to the timetable set by the EEA).

In parallel, a data harvest for micro litter data sets was undertaken in June 2024. After harvesting, the data packages were delivered to the OGS as coordinator for the marine litter data collections. The delivery included lists indicating which datasets had been added or updated since the last round of harvesting and which datasets were still the same as before. The latter helps the OGS as it does not have to repeat its validation and harmonisation activities for these "old" data records. In a later phase, a harvest for beach and seafloor litter will also be undertaken. The latter has been delayed at the request of the contributing Member States, who had to revise their submissions and did not want to publish them in the current version (see Task 7).

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

All EMODnet Chemistry data products are hosted by ULiege (in the Ocean Browser for the eutrophication maps), HCMR Geoserver (for the contaminants maps) and IFREMER Geoserver (for the marine litter maps). These map layers are easily accessible as OGC layers via the Map Viewer of the central portal. In addition, all interpolated DIVA eutrophication maps are available in NetCDF format via the EMODnet ERDDAP service.

During the reporting period, efforts were made to improve the accessibility and interoperability of the EMODnet collections through the use of ERDDAP. Following an in-depth analysis, a step-by-step workflow was developed. The process started by focusing on eutrophication data in a test environment. The collections, divided by region, were downloaded and split into smaller files. ERDDAP datasets were then created from the ASCII files. The next step is to convert the ERDDAP data sources from ASCII format to NetCDF CF format to optimise performance. Once this work has been completed, it will be useful to consider the possibility of publishing the data using a WMS to display the stations on the CP Map Viewer.

For all these products, metadata records are maintained in the EMODnet Chemistry product catalogue, which is based on the SeaDataNet Sextant catalogue, and an OGC CSW service is in operation for the central portal to include metadata records in the CPproduct catalogue.

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

download data and data products:

All EMODnet Chemistry data, data products and content are made available through the EMODnet Map Viewer, the EMODnet Product Catalogue and the narrative in the central portal. Use is made of machine-to-machine services from EMODnet Chemistry partners to the Central portal services to feed the map viewer and catalogue by which data and data products are made directly available for download.

During the reporting period, the Sextant product catalogue was updated with metadata records for the five eutrophication map layers, which illustrate the potential of the webODV services, and the twelve newly released regional collections.

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

EMODnet Chemistry continuously revises the narrative section and contributes to both news updates and the monthly newsletter in accordance with the specified guidelines. During the reporting period, 4 use cases were finalised and published (two on marine litter and two on eutrophication) and a reorganization of the text in the narrative has been implemented.

Task 6: Ensure the involvement of regional sea conventions:

During the reporting period, EMODnet Chemistry maintained active dialogue with all RSCs through the MSFD Technical Groups (see Task 7 for more details) and with the four RSCs directly.

During the reporting period, a meeting of the MSFD board of experts was organized to present the new developments of webODV and evaluate its further use by the RSCs (31 May 2024). Detailed information on the event was published in the June release of EMODnet newsletter and in a full news piece (https://emodnet.ec.europa.eu/en/webinar-showcasing-emodnets-chemistry-offer-data-exploration-and-extraction). Communication is on-going with the EMODnet Secretariat to agree on the publication of a new page dedicated to the MSFD Board in the narrative.

Task 7: Contribute to the implementation of EU legislation and broader initiatives for open data:

EMODnet Chemistry contributes to the implementation of EU legislation by participating in the MSFD Working Group on Data, Information and Knowledge Exchange (WG DIKE) and the Technical Group on Data (TG Data), which were recently re-established and met online on 14 May 2024, as well as in the MSFD Expert Group on Contaminants and the MSFD Technical Group on Marine Litter. The latter met in Valencia, Spain (20-22 May 2024). In all these meetings, the adoption of EMODnet Chemistry as a data platform for the collection of data on marine litter, eutrophication and contaminants has been discussed.

During the last TG ML, the JRC launched a call for data to all Member States for the update of beach, seafloor and microlitter data in EMODnet as well as for new examples of seabed data from imagery to finalise the proposal for a new data management system including imagery.

In addition, EMODnet Chemistry co-organised with NOAA and UNESCO's IOC the International Workshop to advance ocean carbon and acidification data management and interoperability, which took place in Venice on 7-8 May 2024. The conference report, which provides the framework for defining a global network of DACs, is currently being finalised.

Finally, EMODnet Chemistry participated in the Digital Ocean Forum 2025 and is currently finalising the subcontract with VLIZ for EDITO-Infra.

Task 8: Monitoring quality/performance and dealing with user feedback:

Since centralisation, the use of the Chemistry narrative at the Central Portal is monitored via Europa Analytics and the EMODnet secretariat provides quarterly statistics. Chemistry has developed a new tool (Greylog) to monitor the viewing and downloading of EMODnet Chemistry data products from their providers (notably Ocean Browser, IFREMER Geoserver, HCMR Geoserver and DOI landing pages), which has been configured to produce the overall download statistics presented in this quarterly report. The EMODnet Chemistry Helpdesk is also centralised: all user interactions are recorded by the EMODnet Secretariat Helpdesk and forwarded to the lots via JIRA tickets. Relevant JIRA tickets are answered immediately.

Task 9: Maintain the existing thematic web portal for a maximum of 6 months from the start of the project:

This Task refers to the first project phase. No activity is reported for the renewal period.

Status of the Milestones and Deliverables listed in the workplan					
Milestone/Deliverable in numerical order	**WP**	**Date due**	**Status (To do/ Delivered/ Delayed)**	**Date delivered**	**If Delayed: reason for delay and expected delivery date**
D1.1 Quarterly concise progress reports	WP1	M3 (03/01/2024), M6 (03/04/2024), M9 (03/07/2024), M12 (03/10/2024), M15 (03/01/2025), M18 (03/04/2025), M21 (03/04/2025)	Delivered (M3 Q42023, M6 Q12024, M9 Q22024)	15/01/2024, 15/04/2024 15/07/2024	
D1.2 Annual Interim report	WP1	M13			
D1.3 Final report	WP1	M26			
D1.4 Handover plan for service continuity	WP1	M26			
D1.5i Short minutes/action list of project meetings	WP1	M1 (03/10/2023), M6 (03/04/2024), M12 (03/10/2024), M18 (03/04/2025, M23 (03/09/2025)	Delivered (M1, M6)	28/11/2023 (PFG meeting) 19/04/2024 (SC meeting)	
D1.6 Providing content to the central portal	WP1	Continuously	Delivered		
D2.2i Training activity for DC	WP2	M4 (03/02/2024)	Delivered	30-31/01/2024	

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**
D2.2i Data harvested for eutrophication, including rivers	WP2	M3 (03/01/2024), M12	Delivered (M3) 15/02/2024	15/02/2024	
D2.3i Data harvested for contaminants	WP2	M4 (03/02/2024), M14	Delivered (M4)	28/03/2024	
D2.4i Data harvested for beach and seafloor	WP2	M7, M17	Delayed		Following TG ML's call for data, we received several contributions. Especially Spain reviewed the data of the last 4 years and Denmark the last year. They asked not to publish the old versions (which would be in the harvest). We have therefore decided to postpone the publication of the data on beach and seafloor litter until **mid-August 2023**. This delay should not affect the publication of the new beach and seafloor litter maps planned for M17.
D2.5i Data harvested for microlitter	WP2	M7, M17	Delivered	25/06/2024	
D2.6i Data harvested for new litter types	WP2	M16			
D2.7 Updates on marine litter guidelines	WP2	M6 (03/04/2024)	Delayed	October 2024	Discussed at TG ML in May 2024, needs revision and endorsement by TG ML

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**
D3.1 Validated pan-European collections for eutrophication, including rivers	WP3	M7, M19	Delivered (M7)	31 May 2024	
D3.2 Validated collections for contaminants	WP3	M7, M19	Delivered (M7)	31 May 2024	
D3.3 Validated collections for beach and seafloor litter	WP3	M11, M21			
D3.4 Validated collections for microlitter	WP3	M11, M21			
D3.5 Validated collections fornew litter types	WP3	M20			
D3.6 High-resolution DIVAmaps near river mouths	WP3	M21			
D3.7 New maps for contaminants	WP3	M15			
D3.8 New pan-European and regional DIVA maps foreutrophication	WP3	M21			
D3.9 New maps for microlitter	WP3	M17			
D3.10 New maps for beach andseafloor litter	WP3	M17			
D4.1 Standard machine-to- machine services delivered for common functionalities	WP4	M3	Delivered	January 2024	
D4.2 Dedicated machine- to- machine services and APIs adapted / delivered for special functionalities	WP4	M9			
D4.3 Upgraded databases for new litter types	WP4	M12			
D4.4 Improved services for eutrophication	WP4	M10			

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**
D4.5 Improved services for marine litter	WP4	M10			
D4.6 Improved services for contaminants	WP4	M12			
D4.7 Improved webODV tool and integration in central portal	WP4	M18			
D4.8 Monitoring data about visits and usage	WP4	Continuously	Ongoing		
D5.1 Operate Help-desk via Jira tickets	WP5	Continuously	Delivered		
D5.2 Meetings of Board of MSFD experts	WP5	M16, M18,M22	Delivered (an extra meeting to show EMODnet Chemistry webODV data explorer and extractor service)	31 May 2024	
D5.3 International cooperation and interoperability	WP5	Continuously	Delivered		
D5.4 Promotional material and up-to-date thematic space at central portal	WP5	Continuously	Delivered		
D5.5 Presentations at relevant conferences	WP5	Regularly	Delivered		

2. Identified issues: status and actions taken

*[Provide an **overview of issues** identified by CINEA/ DG MARE/ Secretariat (Table A) in the past quarter - new as well as pending ones, the status of those issues, and actions taken to address them and/or roadmap with remaining actions planned to resolve the issues. In Table B, provide information about any issues andchallenges identified by yourself.]*

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**
Chemistry to review layer legends and add units where they are missing (EM-648)	Resolved	Chemistry included units in the maps "Concentration values"	n.a.	
Chemistry - Web Services MetadataUrl and DataUrl fields (EM-84)	Pending	OGS will support HCMR to solve the issues.	n.a.	
EMODnet lots to check if filter values are displayed in the preferred order (EM-957)	Pending			

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**
Map Viewer - add new Subfolder for Chemistry - webODV maps (EM-894)	Resolved		n.a.	
Products download in the Map Viewer (EM-962 and EM-623)	Pending	Add the functionality to download the full product (data product) to the Download button.		
View and Download in the Products Catalogue (EM-963)	Pending	Add the product download functionality to the Download icon in the catalogue (Main page, on the top at the right). Add the direct links from the product catalogue to the viewer in the selected product layer. This functionality was already available in the Chemistry portal, so there should be no problems with multiple UUIDs.		
No possibility to change the color scale in the climatologies (EM-743)	Pending			
New Contaminants Maps for EMODnet Chemistry	Resolved		n.a.	

(EM-625)				
Chemistry to provide input to the Tools & Guidlines section (EM-640)	Resolved		n.a.	
Create "NEW' Chemistry page on CP (dev) (EM-506)	Pending			

3. Communication assets

[In Table A, list peer reviewed publications directly (co-)authored by consortium and project partners in the reporting period. In Table B, list all non-peer reviewed publications (co-)authored. In all cases, indicate the type of publication, provide the full reference incl. title, volume and issue etc., and whether the publication is open or closed access.]

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**
	e.g. paper; conference proceedings; book chapter; …				
02/02/2024	Paper	Mentaschi, L., Lovato, T., Butenschön, M., Alessandri, J., Aragão, L., Verri, G., ... & Pinardi, N. Projected climate oligotrophication of the Adriatic marine ecosystems. *Frontiers in Climate*, *6*, 1338374.		https://doi.org/10.3389/fclim.2024.1338374	Yes
21/03/2024	PhD Thesis	Pietropolli, G. (2024). MACHINE LEARNING APPLICATIONS TO DATA RECONSTRUCTION IN MARINE BIOGEOCHEMISTRY. https://hdl.handle.net/11368/3071880			Yes
June 2024	Paper	Galgani, F., Lusher, A. L., Strand, J., Haarr, M. L., Vinci, M., Jack, E. M., ... & Van Bavel, B. (2024). Revisiting the strategy for marine litter monitoring within the european marine strategy framework directive (MSFD). *Ocean & Coastal Management*, *255*, 107254.		https://doi.org/10.1016/j.ocecoaman.2024.107254	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
	e.g. paper; conference				

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**
	proceedings; book chapter; …				

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

4. Monitoring indicators

[Refer to the standardised monitoring tool, i.e. Europa Analytics, to complete the indicators excel template, and provide a short explanation in the table below on the numbers and trends for each indicator when possible/applicable. Indicate clearly if monitoring was carried out using tools other than Europa Analytics.]

Comments on the progress indicators in the indicators spreadsheet		
Progress indicator	**Means of collecting figures**	**Comment**
1. Current status and coverage of total available thematic data A) Volume and coverage of available data	CDI catalogue service	Several new data sets have been entered, while also a number of data sets have been reviewed and deprecated. Overall, it results in a steady increase of data.
What is your opinion on the data coverage within EMODnet for your thematic?	CDI catalogue service	The data coverage is very good for all sea regions and there is a steady increase for most regions
B) Usage of data in this quarter	CDI RSM shopping ledger service and personal requests	The number of CDI downloads is much lower (-98%) than in the previous quarter. This has been compensated by 6+32+9 download of regional aggregated datasets for Contaminants, Eutrophication and Litter respectively. Each collection includes thousands of CDIs which has been standardised, harmonised and validated.
2. Current status and coverage of total number of data products A) Volume and coverage of available data products	Sextant Product Catalogue	For fertilisers, the positive trend takes into account the new webODV maps in the Map Viewer (Eutrophication (depth and density layers)) and the global data collections in the Products Catalogue. The negative trends are not due to the productivity of EMODnet Chemistry, as the number of products for the subthemes has not changed compared to the previous quarter, nor has the number of products on radionuclides. These trends are due to the development of a system that makes analysing the statistics for 2A easier and more reliable. The system allows us to review all products in detail, which has led us to track down entries for some web services listed in the product catalogues and no longer include them. We have also decided to use the same subthemes for 2A and 2B, namely the EMODnet Chemistry group of variables (P36).
B) Usage of data products in this quarter	Download Tracking service for data products	OGS has set up a Graylog solution for central log management to analyse statistics on the number of products downloads from different internal sources. This quarter Graylog received the logs from OGS (data collections), HCMR (contaminant maps) and CINECA (DIVA eutrophication maps). The workflow for receiving the logs of the marine

		litter maps from IFREMER has been established. Depending on AWI availability, OGS and AWI have agreed to work on integrating the logs from webODV in October this year.
3. Internal and external organisations supplying/approached to supply data and data products within this quarter	CDI catalogue service	New data have been supplied by 8 regular data providers. While, 2 providers made de-activations of existing data sets after further QA-QC.
4. Online 'Web' interfaces to access or view data	Manual compilation	HCMR WMS and WFS services for contaminants added, replacing earlier services by OGS
5.1 Daily number of page views of EMODnet Thematic entry page	Europa Analytics	The Chemistry section is visited every day with a maximum of 30 visitors per day. In this respect there is not much difference between the current and previous quarter.
5.2 Quarterly total number of visitors, page views, unique page views and percentage of returning visitors	Europa Analytics	The numbers in the last quarter are just a little bit lower than in the previous quarter, so quite steady.

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

5. List of abbreviations and acronyms

AWI: Alfred Wegener Institute.

CDI: Common Data Index, which provides a highly detailed description of the data, answering the questions: where, when, how, and who collected the data, and how to get them. One CDI describes a data series which can be a vertical profile on a fixed location, a timeseries or a trajectory dataset.

CINEA: the European Climate, Infrastructure and Environment Executive Agency.

CMEMS: the Copernicus Marine Environment Monitoring Service (led by Mercator-Océan).

CP: Central Portal

DIVA: Data-Interpolating Variational Analysis, a software tool that allows to spatially interpolate (or analyse) observations on a regular grid in an optimal way.

DOI: Digital object identifier.

EC -JRC: European Commission Joint research Centre.

EDMO: European Directory for Marine Environmental Data.

EEA: European Environment Agency.

HCMR: Hellenic Centre for Marine Research.

HELCOM Convention: Baltic Marine Environment Protection Commission, the governing body of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, known as the Helsinki Convention.

ICES: International Council for the Exploration of the Sea.

IFREMER: French Research Institute for Exploitation of the Sea.

MSFD is the Marine Strategy Framework Directive.

NODC: National Oceanographic Data Centre defined within the International Oceanographic Data Exchange (IODE) System of the UNESCO Intergovernmental Oceanographic Commission(IOC).

Ocean Browser: the EMODnet Chemistry data products viewing and downloading service that allows users to visualize gridded fields on-line. It is based on open standards from the Open Geospatial Consortium (OGC), in particular Web Map Service (WMS) and Web Feature Service (WFS).

webODV: the Ocean Data View – online, the online service to explore, subset, visualize, and extract data sets in multiple formats from the harmonized, standardized, validated data collections that EMODnet Chemistry is regularly producing and publishing for all European sea basins for eutrophication and contaminants.

OGC: Open Geospatial Consortium.

OGC CSW: the Open Geospatial Consortium Catalog Service for the Web.

OGC WMS-WFS: the Open Geospatial Consortium Web Map Service and Web Feature Service.

OSPAR Convention: the Convention for the Protection of the Marine Environment of the North- East Atlantic.

RSCs: Regional Sea Conventions.

SeaDataNet: the pan-European infrastructure for ocean & marine data management sponsored within FP7 (grant agreement 283607, 1/10/2011-30/9/2015) linking more than 100 national oceanographic data centres and marine data centres from 35 countries riparian to all European seas.

Sextant products metadata catalogue: the EMODnet Chemistry data products discovery service used for searching Chemistry data products and linking to the viewingservice.

TG Data: the MSFD Common Implementation Strategy Technical Group on Marine Data.

TG ML: the MSFD Common Implementation Strategy Technical Group on Marine Litter.

ULiege: University of Liège.

WG DIKE: Working Group on data, information and knowledge exchange.