EMODnet Thematic Lot n°5 – Chemistry

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Start date of the project: 03/10/2023 (24 months)

Operational Phase

Final Progress Report

Reporting Period: 03/10/2023 – 02/10/2025

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Contents

1 Introduction

EMODnet Chemistry entered its operational phase in October 2023, following a two-year contract extension to October 2025. While its core mission remains the collection, storage, aggregation and harmonisation of marine chemical data and the generation of high-quality data products, this phase focuses on developing a more coherent, effective, efficient, integrated and fit-for-purpose EMODnet, and on promoting its use by industry, policy, and scientific data users. The basic structure of EMODnet, consisting of seven thematic groups (bathymetry, biology, chemistry, geology, human activities, physics and seabed habitats) responsible for gathering and curating data, developing data products based on continuously updated data snapshots, and providing access to these products, will be maintained together with a secretariat and an ingestion facility. However, a further step is providing a **seamless, fit-for-purpose data service** to strengthen the EMODnet Portal as the entry point for finding, viewing, and downloading data.

As one of the seven themes, **EMODnet Chemistry** has expanded and further improved the products and services developed in the previous phases. It has worked towards full interoperability with the services developed by other thematic groups, in line with the INSPIRE Directive, and is open to receiving data provided through the EMODnet data ingestion facility. The following aspects have been addressed:

- maintaining and further improving methods to access and manage chemical observation data in repositories, particularly regarding measurements of **chemical concentrations in seawater, sediments, and biota**, relevant to the Marine Strategy Framework Directive (MSFD), the Water Framework Directive, the Nitrates Directive, or global climate change;
- updating and expanding data products on **eutrophication**, **ocean acidification**, **contaminants,** and **marine litter** in the three matrices to provide users with information on the temporal and spatial distribution and quality of the parameters;
- interacting with the EMODnet Portal Technical Team to ensure that data and data products can be found, viewed, and downloaded. All data, metadata, and data products are made available for viewing and downloading free of charge and without usage restrictions;
- providing updated content for the Chemistry section of the EMODnet Portal;
- ensuring coherence with the efforts of the Regional Sea Conventions (RSCs) and other relevant local stakeholders;
- contributing data to EU reporting mechanisms and participating in working groups. The initial focus was on marine litter data, but this was quickly extended to include eutrophication of the water column and contaminants in the three matrices (seawater, sediment, and biota);
- facilitating the accessibility of all existing and new data and data products through EU open data initiatives such as the Open Data Portal, the European Open Science Cloud (EOSC), and others;
- providing interoperability with data disseminated by non-EU organisations: the international initiative of the Japanese Ministry of the Environment (MOEJ) to harmonise micro-litter data, the CoP Chemicals Dimension of the Global Partnership on Plastic Pollution and Marine Litter (GPML), and the SDG 14.3.1 Federated Data System;
- ensuring compliance with the INSPIRE Directive and Digital Earth processes;
- maintaining quality and performance in handling user feedback through a centralised helpdesk service.

All major European sea regions are covered: the Norwegian Sea, Barents Sea, Baltic Sea, N.E. Atlantic Ocean (Celtic Seas, Iberian coast, Bay of Biscay, Macaronesia and Caribbean Sea), Greater North Sea, Mediterranean Sea, and Black Sea, adopting the geographical definitions of the MSFD Directive.

The EMODnet Chemistry consortium comprises a core group of **14 partners** and **2 subcontractors** from 13 countries bordering the European seas, mainly national marine monitoring agencies and major marine research institutes. The partners combine long-standing expertise and experience in the collection, processing, quality control and management of marine chemical data and data products. They also have expertise in the development and operation of distributed data infrastructure and in the provision of discovery, access, and viewing services following INSPIRE implementation rules and international standards (ISO, OGC). Furthermore, the consortium has mobilised a group of **26 institutes (research institutes, data centres and monitoring agencies)** willing to support the initiative, provide advice on the planned activities, and contribute chemical observation datasets acquired in the seawater, sediment and biota compartments. For this reason, it was decided to establish **an open Advisory Forum** that brings together extensive national and regional expertise and knowledge on EMODnet Chemistry data and its potential to contribute to good environmental status (GES) indicators and the implementation of the MSFD. The contract continues to be fulfilled by almost the same partnership that started in 2009, through an active collaboration with the SeaDataNet network of National Oceanographic Data Centres (NODCs), which has been extended in this renewal phase to include the German Data Centre (BSH), an existing SeaDataNet partner. EMODnet Chemistry has adopted and adapted several **SeaDataNet** standards, tools, and services for optimal marine data management. These have been modified, where necessary, to improve the 'FAIRness' (Findable, Accessible, Interoperable, and Reusable) of metadata, data, and data products, and their fitness-for-purpose for EMODnet Chemistry's target user groups. This synergy has enabled most effort to be dedicated to chemistry data collection and the development of data products, taking advantage of a well-integrated network, well-consolidated standards for data, metadata, and services, and efficient tools.

EMODnet Chemistry has become **an essential contribution to data and information sharing within the MSFD** by increasing the accessibility and interoperability of marine data. This has been achieved through the steady engagement with RSCs and the International Council for the Exploration of the Sea (ICES). EMODnet Chemistry provides additional sources of in-situ data to the Copernicus programme. Building on the results of the last few years, and having achieved confidence and acceptance in its databases, derived data products, and data services by the MSFD community, RSCs, and Member States, this phase marks a major step in the implementation of activities. EMODnet Chemistry has been adopted as **the European data platform** supporting the assessment of Descriptor 10 (marine litter) and is further expanding to Descriptor 8 (contaminants in the environment) and Descriptor 5 (eutrophication).

EMODnet Chemistry has also positioned itself as **an essential data service supporting global environmental policies** by contributing to the Global Partnership on Plastic Pollution and Marine Litter (GPML) through the sharing of data and products on the Digital Platform, the Community of Practise for Data Harmonisation, and the G20 Action on Marine Plastic Litter led by the Japanese Ministry of the Environment (MOEJ) with the development of the Atlas of Ocean Microplastic (AOMI), under the umbrella of the Integrated Marine Debris Observing System (IMDOS).

2 Update on the Tasks

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

EMODnet Chemistry gathers measurement datasets on seawater quality from many data sources and makes them findable, accessible, interoperable, and reusable. This is achieved by making use of the SeaDataNet Common Data Index (CDI) data discovery and access service. During the two years of the extended contract, the number of datasets in the EMODnet Chemistry CDI service has increased from circa 1,230,000 to circa 1,310,000 CDI entries, of which currently circa 1,140,000 relate to the European seas. Also, major activities have taken place for checking and improving the quality of the metadata and data, both for syntax and content. The CDI service allows users to browse datasets in more detail, to narrow their query and download a selection of datasets. In addition, marine litter data for beach litter and seafloor litter, also coming from different sources, are managed in two central databases, involving considerable efforts for validation, classification, and metadata documenting. At the end of the two years, the marine litter databases at OGS contain data on 18,715 beach surveys, 34,074 seafloor trawls, and 2,738 metadata records for floating micro-litter. The new data sets for all chemical substances have been brought together by 39 data providers from 27 countries.

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

EMODnet Chemistry undertakes activities to harmonise, standardise, and validate measurement data harvested from the CDI service, making them available as data snapshots for: i) eutrophication (nutrients, chlorophyll, and oxygen) and acidification (alkalinity and pH) in seawater; ii) contaminants in seawater, biota, and sediment; and iii) marine litter in seawater and sediment. These data collections form the basis for generating interpolated maps of the distribution of selected eutrophication parameters on a regular grid at various temporal and spatial resolutions (annual climatologies for all European seas, 6-year analyses at the basin scale, and seasonal analyses in selected coastal areas), as well as dedicated maps showing the distribution of contaminants and marine litter at measurement points. These data products provide information on the spatial and temporal distributions and quality of the measured data on a regular 3D grid (for eutrophication) and at data points (for pollutants). The latter are mainly collected along the coast and cover recent years. All data products are generated for a selected number of parameters chosen by the Chemistry network together with the MSFD Expert Panel.

Two snapshots for eutrophication and contaminants datasets were carried out in February 2024 and March 2024. The six regional managers worked intensively with the harvested data and metadata and met regularly for coordination. In May 2024, new versions were published as regionally aggregated, validated, and harmonised eutrophication and contaminants data collections. HCMR created new maps for contaminants, showing the number of measurements (all years) for 12 parameters, monitored matrices (all years) for all available contaminants, and the group of marine organisms in which contaminants were measured for 8 parameters.

In June 2024, micro-litter datasets were harvested for harmonisation, validated by OGS, and submitted to IFREMER for the creation of new maps. In September 2024, data were harvested for beach litter datasets, while in November 2024 another data harvest took place for seafloor litter datasets. Both the beach and seafloor litter data collections were aggregated and validated by OGS and provided to IFREMER for map generation and publication at the end of November to early December 2024. In the map viewer, 18 maps for beach litter, 9 maps for seafloor litter, and 15 maps for floating micro-litter were updated or newly created, as well as 6 layers to improve the accessibility of the eutrophication data collection in the OGS ERDDAP service.

During the same period, the regional coordinators met regularly to discuss progress and agree on a common approach to product creation for eutrophication and contaminants. A dedicated working group on the data quality control protocol reviewed and updated the definition and limits for broad range checks. In particular, a major revision of the list of P01 codes to be aggregated into the selected P35 codes was undertaken, together with a revision of the harmonisation rules. The working group also identified the need to distinguish range checks for open and non-open water, determined by the 12 NM boundary. In December 2024, two further data harvests were carried out for eutrophication and contaminants respectively. These data packages were used by the regional coordinators to update the aggregated validated data collections of EMODnet Chemistry in the following months. This time, the entire dataset (comprising old, updated, and new data from data providers) was subjected to a quality check. In addition, the major revision of the list of P01 codes to be aggregated into the selected P35 codes continued, along with the revision of the harmonisation rules. The resulting data collections for eutrophication and contaminants were delivered and published in June 2025, while the updated derived maps were published in September 2025.

Finally, in July 2025, two data harvests were undertaken, one for seafloor litter and one for micro-litter datasets. These were processed by OGS, and updated validated collections were delivered in early October 2025.

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

All EMODnet Chemistry data, data products, and content are available through the EMODnet Map Viewer, the EMODnet Product Catalogue, and the narrative in the EMODnet Portal. Machine-to-machine services from EMODnet Chemistry partners to the EMODnet Portal feed the map viewer and catalogue, making data and data products directly available for download. During the reporting period, a new set-up was installed for hosting and operating the web services. All EMODnet Chemistry data products are now hosted by ULiege (in the Ocean Browser for eutrophication maps), by HCMR GeoServer (for contaminants maps), and by IFREMER MapServer (for marine litter maps). These map layers are easily accessible as OGC layers via the EMODnet Map Viewer. In addition, all interpolated DIVA eutrophication maps are available in NetCDF format via the EMODnet ERDDAP service, while OGS has also configured an ERDDAP instance (https://erddap.emodnet-chemistry.eu/erddap/index.html), which now provides access to validated data collections on eutrophication, beach litter, seafloor litter, and micro-litter, with ongoing activities for beach litter and contaminants.

All EMODnet Chemistry datasets, used as input for the mentioned data products, are accessible through the CDI Data Discovery & Access Service, which users can reach via the Chemistry narrative at the EMODnet Portal. To enhance user experience, dedicated OGC WMS-WFS services with dataset locations per chemical group (P36) are available in the EMODnet Map Viewer. This allows users to click on map objects, leading them to the corresponding group records within the CDI service interface.

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

Two EMODnet Chemistry catalogues are kept updated: 1) the CDI Catalogue, which facilitates the discovery and access of datasets, made available through the narrative area and CDI map layers in the CP Map Viewer; 2) the Sextant Product Catalogue, updated with metadata records for new data products such as aggregated validated data collections and derived maps. The EMODnet Portal collects Sextant content for inclusion in the Products Catalogue, making associated data products directly downloadable. For this purpose, an OGC CSW service operates for the Sextant Product Catalogue, enabling the EMODnet Portal Catalogue service to harvest product records.

New versions of the various chemistry maps are included in the EMODnet Map Viewer using OGC services. Eutrophication maps and animations are published by ULiège via its OceanBrowser service; contaminants

maps and statistics are published by HCMR via its GeoServer service; marine litter maps and statistics are published by IFREMER via its MapServer service.

The webODV service for viewing, extracting, and exploring data has also been updated with the latest eutrophication and contaminants data collections. This service is accessible to users through the Chemistry narrative. A new map category has been introduced in the Map Viewer: Eutrophication maps (depth and density layers). It features five map layers illustrating the potential of webODV services for creating scientific data maps.

The Chemistry ERDDAP instance is also accessible to users through the Chemistry narrative and provides access to validated data collections on eutrophication, beach litter, seafloor litter, and micro-litter.

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

EMODnet Chemistry continuously revises the narrative section and contributes to news updates and the monthly newsletter in line with the specified guidelines. During the reporting period, EMODnet Chemistry took over the task of updating the content of its narrative section via DRUPAL. Six new use cases were drafted and published: two on marine litter, three on eutrophication, and one on data collections concerning contaminants and eutrophication. A new web page dedicated to the EMODnet Chemistry MSFD Board of Experts on the MSFD was also drafted, and all content related to the P36 vocabulary was updated to reflect the new nomenclature. In addition, thirty-one news items and two upcoming events were published on the portal and included in the monthly newsletter.

Task 6: Ensure the involvement of regional sea conventions

Since its launch in 2009, EMODnet Chemistry has engaged stakeholders from the RSCs and the MSFD. In 2017, this outreach was formalised with the creation of the MSFD Board of Experts, with ICES maintaining regular dialogue on behalf of EMODnet Chemistry. Four meetings with the MSFD Board of Experts were held during the two-year period: on 4 February 2025 and 24 March 2025 to present and discuss further improvements to the latest maps on the spatio-temporal distribution of contaminants and marine litter; on 31 May 2024 to present new developments of webODV and evaluate its further use by the RSCs; and on 29 September 2025 to present and refine new DIVA maps on key eutrophication parameters.

EMODnet Chemistry maintains dialogue with the ICES Working Group on marine litter to define the dataflow from the ICES DOME Database to Chemistry databases. Collaboration with CEDRE and HELCOM was further strengthened, enabling the integration of beach litter data from OSPAR and HELCOM countries into the EMODnet Chemistry CDI data service and the 2025 data collection. These datasets also support HELCOM's environmental assessments. Thanks to ICES activities, eutrophication and hazardous substances data from HELCOM and OSPAR were also integrated with EMODnet Chemistry.

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

EMODnet Chemistry supports the implementation of EU legislation, in line with discussions and agreements resulting from participation in the MSFD Technical Group on Marine Litter, the MSFD Expert Group on Contaminants, the MSFD Technical Group on Data, and related events. The Consortium and JRC collaborated to prepare the data availability analysis presented at the GES meeting. At the EMODnet Open Conference and Jamboree 2023, EMODnet Chemistry co-chaired the EMODnet and EU Policy Townhall discussion, where JRC, HELCOM, and EEA confirmed their use of EMODnet data and data products for EU policy (MSFD, MSP, Birds and Habitats Directive, and others) and highlighted EMODnet Chemistry's strong commitment to supporting the MSFD and WFD. At the same event, EMODnet Chemistry's contribution to global initiatives, including ocean best practices and global ocean data services for the UN SDGs, was presented.

During the reporting period, the OGS team maintained regular contact with the JRC team to provide beach litter, seafloor litter, and micro-litter datasets, and to support the management of seafloor litter from imagery. New guidelines were prepared to support the development of the Database Management System and accompanying tools for data entry and validation.

Following EEA deadlines, EMODnet Chemistry aligns with ICES activities to support the computation of indicators for periodic environmental assessment reports, with eutrophication and hazardous substances data integrated with EMODnet Chemistry and delivered to the EEA.

From a global perspective, EMODnet Chemistry participates in regular meetings of the International Working Group on Ocean Acidification to discuss the metadata model for the federated ocean carbon data system and the vocabulary system; in the international effort to build an open-access Global Ocean Oxygen Database and ATlas (GO2DAT); in the International Action against Marine Plastic Litter organised by the Japanese Ministry of Environment (MOEJ), with meetings in Tokyo and online; in regular meetings of the Community of Practice on Data Harmonisation and product sharing of the Global Partnership on Plastic Pollution and Marine Litter (GPML); in the International Workshop on Marine Litter in Shanghai; and at the UN Ocean Conference in 2025 in Nice, France.

EMODnet Chemistry co-organised, together with NOAA and UNESCO's IOC, the International Workshop to advance ocean carbon and acidification data management and interoperability, held in Venice on 7–8 May 2024.

Finally, the EMODnet Chemistry coordinator and technical coordinator participated in the Digital Ocean Forum events and contributed to EDITO-Infra development through a dedicated, limited subcontract with VLIZ.

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

Since centralisation, the EMODnet website's visualisation has been 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 sources, notably Ocean Browser, IFREMER MapServer, HCMR GeoServer, and DOI landing pages. The software has been shared and configured since Q2 2024 to produce the overall download statistics presented in quarterly reports. The EMODnet Chemistry Helpdesk is also centralised: all user interactions are recorded by the EMODnet Secretariat Helpdesk and redirected 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 projects

This Task refers to the first project phase. No activity is reported for the renewal period, as the previously existing thematic web portals were closed in January 2023. Since then, EMODnet Chemistry has maintained back-office infrastructure and web services for interaction with the Map Viewer and Product Catalogue services at the EMODnet Portal.

Status of the Deliverables listed in the workplan					
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, M6, M9, M12, M15, M18, M21	Delivered	15/01/2024, 15/04/2024, 15/07/2024, 15/10/2024, 15/01/2025, 15/04/2025	
D1.2 Annual Interim report	WP1	M13	Delivered	03/11/2024	
D1.3 Final report	WP1	M26	Delivered	03/11/2025	
D1.4 Handover plan for service continuity	WP1	M26	Delivered	03/11/2025	
D1.5i Short minutes/action list of project meetings	WP1	M1, M6, M12, M18, M23	Delivered	28/11/2023, 19/04/2024, 23-24/09/2024, 21/03/2025, 22/09/2025	
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	
D2.2i Data harvested for eutrophication, including rivers	WP2	M3, M12	Delivered	15/02/2024, 06/12/2024	
D2.3i Data harvested for contaminants	WP2	M4, M14	Delivered	28/03/2024, 04/12/2024	
D2.4i Data harvested for beach and seafloor litter	WP2	M7, M17	Delivered	26/09/2024, 26/11/2024, 31/5/2025	
D2.5i Data harvested for micro-litter	WP2	M7, M17	Delivered	25/06/2024, 31/5/2025	
D2.6i Data harvested for new litter types	WP2	M16	Delivered		

D2.7 Updates on marine litter guidelines	WP2	M6	Delivered	02/10/2025	
D3.1 Validated pan-European collections for eutrophication, including rivers	WP3	M7, M19	Delivered	28 June 2024 30 June 2025	
D3.2 Validated collections for contaminants	WP3	M7, M19	Delivered Delivered	28 June 2024 30 June 2025	
D3.3 Validated collections for beach and seafloor litter	WP3	M11, M21	Delivered	27/11/2024 (beach litter) 12/12/2024 (seafloor litter) 02/10/2025	
D3.4 Validated collections for micro-litter	WP3	M11, M21	Delivered	12/09/2024 02/10/2025	
D3.5 Validated collections for new litter types	WP3	M20	Delivered	02/10/2025	
D3.6 High-resolution DIVA maps near river mouths	WP3	M21	Delivered	02/10/2025	
D3.7 New maps for contaminants	WP3	M15	Delivered	30/01/2025	
D3.8 New pan-European and regional DIVA maps for eutrophication	WP3	M21	Delivered	02/10/2025	
D3.9 New maps for micro-litter	WP3	M17	Delivered	03/02/2025	
D3.10 New maps for beach and seafloor litter	WP3	M17	Delivered	03/02/2025	
D4.1 Standard machine- to-machine services	WP4	M3	Delivered	03/01/2024	
D4.2 Dedicated machine- to-machine services and APIs adapted / delivered for special functionalities	WP4	M9	Delivered	June 2024	
D4.3 Upgraded databases for new litter types	WP4	M12	Delayed	02/10/2025	
D4.4 Improved services for eutrophication	WP4	M10	Delivered	July 2024	

D4.5 Improved services for marine litter	WP4	M10	Delivered	July 2024	
D4.6 Improved services for contaminants	WP4	M12	Delivered	02/09/2024	
D4.7 Improved webODV tool and integration in central portal	WP4	M18	Delivered	02/04/ 2025	
D4.8 Monitoring data about visits and usage	WP4	Continuously	Delivered	Continuously	
D5.1 Operate Help-desk via Jira tickets	WP5	Continuously	Delivered	Continuously	
D5.2 Meetings of Board of MSFD experts	WP5	M16, M18,M22	Delivered	04/02/2025 (contaminants) 24/03/2025 (marine litter) 29/09/2025 (eutrophication)	
D5.3 International cooperation and interoperability	WP5	Continuously	Delivered	Continuously	
D5.4 Promotional material and up-to-date thematic space at central portal	WP5	Continuously	Delivered	Continuously	
D5.5 Presentations at relevant conferences	WP5	Regularly	Delivered	Regularly	

3 Work Package updates

WP1 – Project Management

Covering Task(s): Task 5: Contributing content to dedicated spaces in the Central Portal AND Task 9: Maintain the existing thematic web portal for a maximum of 6 months from the start of the projects.

As part of WP1, several management activities have been undertaken, which are reported under the related subWPs.

WP1.1: Project coordination

The EMODnet Chemistry consortium is constituted by 16 participants (as partners and subcontractors) and receives support and input from 26 research institutes, data centres and monitoring agencies who provide chemical expertise and measurement datasets. To manage and lead all project activities, ensuring timely delivery and high-quality results and products, a dedicated management structure has been established with the following bodies:

- Project Coordinator, assisted by the Project Office, for daily management and timely interaction with the EMODnet Secretariat;
- Technical Coordinator, acting as Deputy Coordinator and leading the technical developments in the project and the Technical Working Group;
- Project Steering Group, chaired by the Project Coordinator and comprising the Technical Coordinator, all Partners and Subcontractors;
- Regional Leaders, acting as regional experts for data and products;
- Project Full Group, chaired by the Project Coordinator, and comprising the Project Steering Group and all 26 members of the Advisory Forum.

The Service Contract has been signed by OGS and CINEA/EC, which entered into force on 03/10/2021. The Service Contract contained an automatic renewal clause (Article I.3.5) once for 24 months and renewal price (Article I.4.1) of 2,234,000.00 Euro. The Coordinator and the Partners have signed the Consortium Agreement. The Coordinator and the subcontractors have signed bilateral subcontracts. The Coordinator and the Advisors have signed bilateral advisory agreements. On 28/07/2023 CINEA renewed the Service Contract and requested the update of the Section 3.7 - Planning, workflow and timetable of deliverables of the Technical Proposal by 3 October 2023. This report concerns the 2-year renewal period.

On 22 February 2024, the draft amendment to the Consortium Agreement (CA), the subcontracts, and the advisory agreements were circulated to the signatories for review. The subcontracts with ETT SPA and BODC were signed in February 2024 and May 2024, respectively. On 19 September 2024, the CA signed by all partners was circulated to the signatories. The one-to-one interaction with the advisors to finalise the advisory agreements concluded in May 2024, when all contracts were signed and circulated to the signatories.

To maintain communication, the Project Office defined several mailing lists:

- info@emodnet-chemistry.eu
- partners@emodnet-chemistry.eu
- subcontractors@emodnet-chemistry.eu
- advisory@emodnet-chemistry.eu (open Advisory Forum)
- all@emodnet-chemistry.eu (merging the three lists' partners + subcontractors + advisory)
- board-msfd@emodnet-chemistry.eu (board of MSFD experts)

The first meeting of the Project Full Group, including the advisors, took place in Brussels on 28 November 2023 during the EMODnet Jamboree, and back-to-back with the EMODnet Open Conference. Despite the

established timeline, it was decided to involve the entire network to ensure everyone was informed about the implications of the renewal of phase 5. In particular, data providers were notified that the initial action would be data population to produce the first round of data collections.

The first Steering Committee meeting was held online on 19 April 2024. As detailed in the minutes, each Work Package leader reported on the progress of activities planned for their respective Work Packages, focusing on any possible delays in activities scheduled for the period M1–M6 and on progress with upcoming activities to prevent or mitigate any risk of delay.

The second Project Full Group meeting was held online on 23 and 24 September 2024. As detailed in the minutes, each Work Package leader reported on their respective Work Packages, highlighting administrative, technical, and communication improvements during the period M6–M12, as well as any possible issues that could prevent meeting the deadlines.

The second Steering Committee meeting was held online on 21 March 2025 back-to-back with a technical working group. As recorded in the minutes, the Project Coordinator reported on the general progress of the project over the past six months. She also noted some delayed activities and discussed the necessary corrective actions. Work Package leaders were given time to present their work and request feedback from the participants. The technical working group focused on improvements still needed to enhance Chemistry services on the EMODnet portal.

The third SC meeting was held online on 22 September 2025. The discussion focused on finalising the activities planned for the current phase for each WP, with particular attention to the publication of the climatologies, the deliverables on the new litter types, the final report, and the handover. The SC continued to set the stage for the next phase.

From 10 February 2024 until 15 September 2025, regular technical meetings with OGS, Regional Leaders (HCMR, NIMRD, SMHI, IMR, Au-DCE, and IFREMER), AWI, Uliege, and ICES were held to align the data validation process to produce regional data collections for eutrophication and contaminants, and the related data products. A major effort was dedicated to catching up with the population of eutrophication/acidity and contaminant data (where possible); the contractual data inventory served as extra motivation. In 2024, the creation of data collections for eutrophication/acidity and contaminants required even greater coordination than previous efforts, as EMODnet Chemistry conducted a comprehensive revision of the data and metadata, which occurs approximately every four years. This process enables improvements in the overall quality of the data collections, based on feedback from data providers, Regional Leaders (RLs), or OGS.

WP1.2: Collaboration with other EMODnet lots, Central Portal group and larger EMODnet organisation

During the reporting year, EMODnet Chemistry successfully collaborated with and promoted EMODnet Data Ingestion, as a powerful mechanism to involve external organisations willing to submit data. EMODnet Data Ingestion was heavily used by Member States providing marine litter and other data originating from MSFD official monitoring. Citizen science data were also merged.

The Project Coordinator and Deputy-Coordinator ensured convergence and synergy with all the other EMODnet lots by representation in the strategic groups developing EMODnet, such as the EMODnet Steering Committee, and Technical Working Group. The Project Coordinator and Deputy-Coordinator also attended EMODnet events organised by the European Commission to guarantee the timely transfer of information, commitments, and feedback. EMODnet Chemistry management and technical teams consistently interacted with the EMODnet Portal team via Jira tickets to integrate Chemistry content, services, and tools.

During the reporting period, several meetings were held to define the EMODnet Vision to 2035. These meetings focused on shaping the document describing the Vision and discussing specific aspects required for its implementation.

EMODnet Chemistry worked closely with the EMODnet Secretariat and other thematic lots to contribute to EDITO. This was arranged via a small subcontract from VLIZ with OGS and MARIS.

Concerning the EMODnet portal, Chemistry has regularly updated and provided the Secretariat with content for the Chemistry static web page, as well as for the sections “Use case”, “Report”, “Partnership”, “Tools and Guidelines”, and “News and events”. In particular, new content was added to promote the EMODnet Chemistry ERDDAP service (see WP4) and the interaction with the Chemistry Board of experts on the MSFD (see WP5). According to EC requirements, the web pages titled ‘Eutrophication’, ‘Ocean acidification’, ‘Contaminants’ and ‘Marine litter’ were removed.

During the reporting period, 7 use cases, 31 news items, and the related monthly newsletter were published. Since April 2025, EMODnet Chemistry, together with the other lots, has been responsible for updating the static content and reports through the EC DRUPAL web platform. Finally, several meetings were held with the partners responsible for providing the data product services and with an external company to set up a Graylog system to compute statistics on data product downloads (indicator 2B).

WP2 – Chemistry data collection and metadata compilation and arranging common access

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

As part of WP2, a number of subWP activities have been undertaken, which are reported.

WP2.1: Review of guidelines (CDI metadata and ODV data compilation, refined criteria for QC of contaminants) and Training Activity

During the reporting period the following guidelines were released:

- Guidelines to include complete metadata in the CDIs for EMODnet Chemistry data, 2024
- Updated guidelines for SeaDataNet ODV production Eutrophication Contaminants, 2024
- Guidelines to merge profile and time series data types (eutrophication and contaminants), 2025
- Guidelines for compiling EMODnet Chemistry template/questionnaire on methodologies and QA/QC information and for including its DOI in the CDI/standard metadata, 2024.

Concerning the latter, a questionnaire was developed in 2022 to collect detailed QA/QC information from data originators as reference material to help uniform the quality and reliability of chemical data introduced into EMODnet Chemistry. The questionnaire was designed based on the non-sample specific metadata requirements of the European Environment Agency (EEA), International Council for the Exploration of the Sea (ICES), United Nations Environment Program–Mediterranean Action Plan (UNEP-MAP), and NORMAN Network. Once compiled and returned to EMODnet Chemistry, each questionnaire is assigned a DOI, which should then be linked to the data. The guideline document details the instructions on how to complete the questionnaire and how to link the DOI of a completed questionnaire to a CDI. A Zenodo community dedicated to the EMODnet Chemistry questionnaire was also created for storing and sharing the blank questionnaire for download and all completed questionnaires (https://zenodo.org/communities/emodnetchemquestionnaire). An analysis of the information contained within questionnaires received in 2022 and 2023 was published in October 2023 (Frontiers | Improving data reliability to support marine pollution assessment according to MSFD Descriptor 8 in the European Seas: the contribution of EMODnet Chemistry).

On 30 and 31 January 2024, EMODnet Chemistry organised a training course for all data providers. It took place in Trieste (Italy). The aim of the course was to explain how to feed data into the EMODnet Chemistry data discovery and access service of the SeaDataNet infrastructure. The course started with an overview of the project, including its structure, scope, main achievements, key players and main data management

systems. It then introduced the file formats, vocabularies and software used to standardise and quality control the different types of data and metadata. Participants were also familiarised with the SeaDataNet CDI data discovery and access service. Finally, a brief description of the functions of the webODV Explorer and Extractor was given. The course was attended by 51 participants, 45 of them in person, from 31 organisations and 29 countries. It was led by OGS, MARIS, and a group of 15 experts, including the regional coordinators and work package coordinators.

WP2.2: Chemistry data gathering and metadata population in the CDI Data Discovery and Access service

EMODnet Chemistry relies on a large pan-European network of data centres from marine research institutes and governmental monitoring agencies to gather measurement datasets on the state of the seas and oceans and to make these data findable, accessible, interoperable and reusable (FAIR). This is being achieved by utilising the SeaDataNet standards and the CDI data discovery and access service. All data providers are encouraged to utilise the latest SeaDataNet tools to review existing entries and submit new data: MIKADO for CDI metadata entries, NEMO for converting local data files to ODV formats, NVS vocabularies for mapping local terms to common terms, OCTOPUS for checking data file formats prior to submission. They are also encouraged to install and configure the latest version of the Replication Manager to establish an automatic connection between the data centres and the CDI service. Several meetings were organised between the Regional Coordinators (RCs) and the data providers in the regions concerned to discuss the results of the data harvesting, the corrections required and to refine the data collection activities.

Overall, the number of data records in the EMODnet Chemistry CDI Service has increased from approx. 1,230,000 to approx. 1,310,000 CDI records in the two years of the contract extension, of which approx. 1,140,000 currently relate to the European seas. CDI entries are also created for all marine litter datasets. This allows users to browse the datasets in more detail, narrow down their search and download a selection of datasets. At the end of the two years of the extended contract, the centralised marine litter databases at the OGS contained data on 18715 beach surveys, 34074 seafloor trawls and 2738 floating micro-litter metadata records. The CDI increase represents a data increase for all chemical substances of around 6%, while the overall quality of the metadata and data continued to improve in terms of both syntax and content. The new data sets for all chemical substances have been brought together by 39 data providers from 27 countries.

WP2.3: Formulating formats and vocabularies for reporting marine litter and gathering data in EMODnet databases

EMODnet Chemistry has established robust procedures and protocols for collecting and processing three key types of marine litter data: beach litter (nets, bottles, etc.), seafloor litter (i.e. litter collected by fishing trawlers), and floating micro-litter. The formats, classifications, and data collection methodologies are developed in close collaboration with the TG-ML and the EU-JRC. Significant effort is dedicated to the validation, classification, and documentation (metadata) of incoming marine litter.

There is growing interest in expanding the marine litter data portfolio to include two additional data types: 1) floating marine macro-litter and 2) seafloor litter data from imagery and video. In previous phases, proposals for describing these data types were made in cooperation with the TG ML. The request to manage seafloor image data has arisen from insights and recommendations developed during dedicated meetings and international expert workshops organised by the Joint Research Centre (JRC) and the MSFD Technical Subgroup on Marine Litter (TGML). These groups have closely followed and supported the evolution of this topic over recent years, fostering dialogue among scientific, technical, and policy communities. Through continuous engagement, they have helped refine methodologies and promote harmonised approaches for the collection, interpretation, and integration of seafloor imagery into marine litter monitoring frameworks. The AWI international workshop in 2018 and the OceanObs conference in 2019 were the first two milestones. As a result of these events, the EMODnet consortium published the first data management proposal for seafloor

litter images in 2021, developed in collaboration with experts and stakeholders (https://nodc.ogs.it/catalogs/doidetails?0&doi=10.6092/0de4df9b-0589-48bb-b620-8ebd70a40159). Building on this initial framework, several other workshops and expert discussions held since 2023 have led to the revision and upgrade of the data management proposal. The improvement and implementation of seafloor image data management will support monitoring of seafloor litter using the integrated approach agreed during the TGML dedicated meetings. This integrated approach foresees the use of both seafloor trawling and seafloor image data to obtain a more comprehensive picture of the seafloor environmental state at EU and global levels. Recently (October 2025), a first draft for the management of seafloor images from ROVs, AUVs, and similar methods (e.g. towed cameras) was internally released. The release consists of an initial database, ingestion and validation service, with guideline and template, which is undergoing further testing and improvement.

WP2.4: Nutrient loads by major rivers

Several efforts were made during the reporting period to increase the availability and accessibility of data near river mouths. The approach has been to proceed at the country level, providing good examples of effective data sharing. A dedicated meeting with EMODnet Chemistry and EMODnet Physics was organised by +ATLANTIC CoLAB with the Portuguese Environment Agency and the Hydrographic Institute, which acts as the national oceanographic data centre. EMODnet has demonstrated how it can support interoperability and the continuous ingestion of operational data at the national level through its extensive network of organisations specialising in data management and through its data infrastructure and services, including the connection with historical time series enriched with complementary parameters. Starting with the Portuguese example, the analysis and discussion of operational river discharge data (over 1,000 stations) made available by EMODnet Physics has continued to identify supplementary data on water quality and chemistry. A joint Chemistry–Physics–Ingestion meeting will be organised at the EMODnet Jamboree.

WP3 – Generation of data products, including collections

Covering 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.

As part of WP3, a number of subWP activities have been undertaken, which are reported.

WP 3.1: Generating harmonised, aggregated and validated data collections of eutrophication, contaminants and microplastics

During the renewal period of EMODnet Chemistry 5 (3October 2023 to 2October 2025), efforts focused on expanding and improving the existing collections from the first period of phase 5 with additional data and metadata. Thirteen harvests were carried out for this purpose: in February 2024, December 2024, and March 2025 for datasets on eutrophication; in March 2024, December 2024, and March 2025 for datasets on contaminants; in May 2024, February 2025, and July 2025 for datasets on marine litter – microlitter; in September 2024 and June 2025 for datasets on marine litter – beach litter; and in November 2024 and July 2025 for datasets on marine litter – seafloor litter. Following each data harvest, all six regional coordinators (for eutrophication and contaminants) and OGS (for marine litter) received data packages for their region, along with lists indicating which datasets had been added or updated since the previous harvest and which remained unchanged. This has helped the regional coordinators, as they do not need to repeat validation and harmonisation activities for these unchanged datasets. In 2024, the RLs only worked only with the new and updated datasets, merging them with data collections from previous phases. In particular, they aggregated (only eutrophication data), harmonised, and quality-controlled metadata and datasets (only for eutrophication data for which scientific guidance exists at the regional level). The procedure includes verifying

the adequacy of the vocabularies used, as well as the standards and formats. However, in 2025 the RLs carried out a complete revision of the data and metadata, which takes place approximately every four years. This made it possible to improve the quality of the entire data collections, based on feedback such as errors reported by data providers, RLs, or OGS. This results in an updated data collection with enriched metadata. The available data types are organised in vertical profiles and time series.

The tables for eutrophication and contaminants below show the numbers of profiles and time series per sea region. The percentage of good data is also provided, based on the Quality Flag assigned by the data providers and checked by RLs through the Quality Control loop and according to commonly agreed QC guidelines. These guidelines ensure that data are never modified or removed. The guidelines are as follows:

EMODnet Chemistry Regional Sea eutrophication data collection and Quality Control loop

Quality Control steps for EMODnet Chemistry Contaminant aggregated datasets.

Table for eutrophication. Total number of measurements (CDIs) and percentage of data flagged as good per Sea region for both vertical profiles and timeseries after QC. NS: not sampled.

Sea region	No. meas. Profiles	No. meas. Timeseries	% Good (QF=1,2,5,6,7,8,Q) Profiles	% Good (QF=1,2,5,6,7,8,Q) Timeseries
North Sea	3321403	12191	99%	99.9%
Baltic Sea	210747	157	98 %	99.9 %
Black Sea	74541	11	97.46 %	90.04 %
NE Atlantic Ocean	49325	556	96.6 %	95.1 %
Caribbean Sea	175	93	89.9 %	84.3 %
Arctic Ocean	55007	NS	86.6 %	NS
Mediterranean Sea	264569	13707	92.36 %	88.78 %

Table for contaminants. Total number of measurements (CDIs) per sea region.

Sea region	Profiles			Timeseries			Total
	Water	Sediment	Biota	Water	Sediment	Biota	
North Sea	53399	3746	5881	0	2502	14198	79726
Baltic Sea	3005	2021	1212	0	0	540	6778
Black Sea	30515	4886	527	NS	NS	NS	35928
NE Atlantic Ocean	2415	782	0	0	283	270	3750
Caribbean Sea	34	6	0	0	0	14	54
Arctic Ocean	1012	636	NS	NS	NS	NS	1648
Mediterranean Sea	3329	4840	47	1620	4228	900	14964

Regarding the collection of data on marine litter, as explained before two harvests were conducted, one in 2024 and one in 2025. Beach litter data collection and seafloor data collections were produced at regional level while collections of data for microlitter in sediment were produced at European level. As always, OGS was responsible for compiling the data collections. This included checking the quality of data and metadata in

strict collaboration with the data providers and according to commonly agreed QC guidelines. These guidelines ensure that data are never modified or removed. The guidelines are as follows:

EMODnet Thematic Lot n° 4 - Chemistry Guidelines and forms for gathering marine litter data: beach and seafloor trawlings. Version 7

Guidelines and formats for gathering and management of micro-litter data sets on a European scale (floating and sediment micro-litter). Version 0.2

The tables below show, for each type of marine litter data managed by EMODnet Chemistry, the number of measurements for beach litter and seafloor litter by sea region, and for floating microlitter at the European level.

Table for marine litter. Total number of measurements (surveys) per Sea region for beach litter, seafloor litter and floating microlitter.

Sea region	Beach litter	Seafloor litter	Microlitter
North Sea	5154	20865	
NE Atlantic Ocean	2638	3926	
Arctic Ocean	193		
Baltic Sea	3995	5029	
Mediterranean Sea	4861	4115	
Black Sea	815	480	
Total		34415	4167

WP 3.2: Generating DIVA maps of eutrophication, including WP 3.3: Higher resolution maps at river mouths

A new set of gridded maps for 5 eutrophication variables were created on 3 types of domains: pan-European Seas (1 domain), regional seas (6 domains) and coastal areas (4 domains). All the maps were generated using the DIVAnd interpolation tool (https://github.com/gher-uliege/DIVAnd.jl/) in its version 2.7.2.

The input data files (storing the observations) were updated with respect to the previous release of the products (2023), thus providing better data coverage and a longer time period. The new products have been registered in the Sextant catalogue and are being transferred to the EMODnet Central portal for their visualisation.

WP 3.4: Tuning data collection and dedicated maps on contaminants

The validated regional contaminant data collections (v2024) -prepared within WP 3.1, were used for the production and publication of the new maps for contaminants in this EMODnet phase (Deliverable D3.7). The six regional collections were merged into a single dataset comprising more than 157000 stations and 7450 parameters (based on the SeaDataNet/BODC P01 vocabulary terms), covering the period 1960-2023, and originated from 186 Organizations across Europe. Data are available for 3 matrices: water, sediment, biota. The parameters analysed in terms of the measured substances, what has been measured, matrix, monitored species, etc., and the selected priority pollutants (at around 113000 stations) as defined by the MSFD requirements were: organometals (tributyltin and triphenyltin), metals and metalloids (cadmium, lead, mercury, and nickel), hydrocarbons (anthracene, benzo(a)pyrene, fluoranthene, and naphthalene), and pesticides (DDT-DDE-DDD and hexachlorobenzene).

The products are divided into four categories that provide information on the distribution of sampling locations, data availability and concentration levels in space and time in all European seas and beyond. The

categories are: Concentration values, Measurements counts, Monitored matrices and Contaminants in marine organisms. For the last three categories all available data values were used, while for the first category - concentration values (e.g. median values of the last 6 available years), only values flagged as "good" were used. For water, only surface values were considered (0–15 m), whereas for sediment and biota all depths were included. In total, 44 contaminant maps and animations were published in EMODnet Map Viewer via the HCMR GeoServer service as WMS, WFS. The corresponding metadata descriptions are available in the EMODnet Products Catalogue. The maps (in multiple formats such as GML, shape files, CSV, or JSON) as well as the datasets used (as SeaDataNet/ODV CSV spreadsheets and transposed text files) can be downloaded from the Map Viewer and the Products Catalogue.

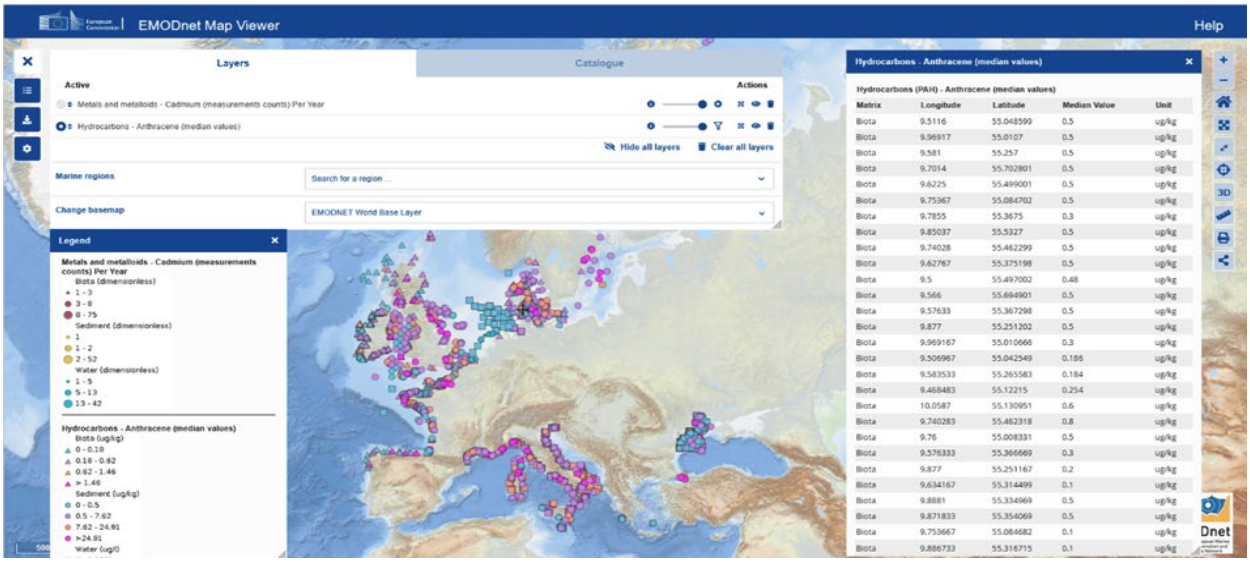

Figure: Example of a contaminants map for Cadmium (measurement counts) and Anthracene (median values) from the EMODnet Map Viewer, with animation and filter options, table statistics display, and a legend.

WP3.5: Generating validated data collections and maps for marine litter and microlitter

These products are included in the EMODnet Chemistry Products catalogue with metadata and DOI. Marine Litter maps are published through the Map Viewer and documented in the Products Catalogue.

The aggregated datasets for beach macrolitter, seafloor macrolitter and floating microlitter are prepared and validated according to the methodology described in "Harmonization and format validation on litter aggregated datasets" (https://doi.org/10.13120/je91-sp43). The aggregated data collections are regional for beach and seafloor litter; for floating microlitter, the amount of data is small, therefore a single collection is prepared with all the available data. Once validated, aggregated datasets are ready to be published in the products catalogue and to serve as input for the elaboration of the maps. Existing maps for beaches and seafloor litter have been updated to incorporate the Joint list of litter categories for the monitoring of marine macro-litter. Maps on floating microlitter have also been updated to reflect international standard units and changes in vocabularies. As agreed at the meeting of the MSFD Board of Expert of Marine Litter, a new map has been created, for both floating microlitter and seafloor litter, to show the spatial distribution of sampling effort over the last 6-year period, reflecting an MSFD assessment period. The experts provided useful advice to improve the understanding and usability of the maps and agreed that these new maps could potentially be used for decision makers of monitoring programmes at regional or national level to assess spatial/temporal gaps in their marine litter sampling effort. In addition, three products on transparency and colour of microlitter were removed. The map publication process involves several steps: 1) Input validated data collections are

delivered by the OGS to IFREMER; 2) IFREMER loads these files into a PostgreSQL database for analysis and statistics; 3) The layers generated are published via OGC services (WMS and WFS) using an open source spatial data publishing platform called MapServer; 4) OGC services are added to the metadata and map viewer to enable the visualisation of map products and their download in several formats (such as shapefile, PNG, PDF). Existing documents have been updated: "EMODnet Visualization products for seafloor litter data" (https://doi.org/10.13120/c622d045-94ed-4b6a-9c78-404e86b8b9a3.v1) and "EMODnet Visualization products for beach litter data" (https://doi.org/10.13120/14cc-r118). A new document has been drafted and published to explain the methodology used to create microlitter maps: "Visualization products for floating micro-litter data" (https://doi.org/10.13120/skvs-yz64)

WP4: Technical development for interoperability, services and tools

Covering Task: 3 - Develop procedures for machine-to-machine connections to data and data products AND **Task: 4** - Contribute data, data products, and content to a central portal that allows users to find, view, and download data and data products

Technical developments are discussed and monitored in the Technical Working Group with MARIS (Technical Coordinator), OGS, IFREMER, ICES, AWI, ULiège, HCMR, NOC-BODC, MI, and VLIZ. The Technical Coordinator also participates in meetings of the EMODnet Steering Committee and EMODnet Technical Working Group to tune technical specifications and developments.

WP4.1: Develop procedures for machine-to-machine connections to data and data products and contributing to their deployment as user interfaces for the users of the Central Portal

Most activities for developing machine-to-machine services at EMODnet Chemistry that feed the EMODnet Portal services, such as the Map Viewer and the Product Catalogue services, occurred in the previous phase of the contract. In the two years of contract extension, only a few activities were undertaken for fine tuning and streamlining. The current interaction between the Chemistry thematic services and the EMODnet Portal is as follows:

- Chemistry documents all its data products with metadata in the SeaDataNet Sextant catalogue service which operates an OGC-CSW service, which is regularly harvested by the EMODnet Products Catalogue service. The Sextant entries include links to the EMODnet Map Viewer, links for downloads, and DOIs. In the reporting period efforts were undertaken for refining the various links in the Sextant records and ensuring that each product is included. The applied principle is that the EMODnet Product Catalogue should include all Chemistry products, while links to the EMODnet Map Viewer should only exist for the latest releases of Chemistry Maps;
- Chemistry produces maps for eutrophication, contaminants, and marine litter (beach litter, seafloor litter, and micro-litter). These maps are published by means of OGC-WMS – WFS services by Chemistry partners. The role division is as follows:
  - Eutrophication maps and animations are published by Uliege via its OceanBrowser service
  - Contaminants maps and statistics are published by HCMR via its GeoServer service
  - Marine Litter maps and statistics are published by IFREMER via its MapServer service
- Chemistry in addition operates and manages an analytical service, WebODV, which facilitates users to browse, extract, and prepare graphics from the aggregated and validated data collections for eutrophication and contaminants. WebODV is very popular as it gives analytical functionality while having a low threshold. It also supports several output formats which is appreciated by MSFD users. WebODV has prepared a number of illustrative maps which are published in the EMODnet Map Viewer and documented in the EMODnet Product Catalogue. During the reporting period, the latest Chemistry data collections were loaded;

- Chemistry makes use of the SeaDataNet CDI Data Discovery and Access service for gathering and standardising data and metadata from all its data providers and with a focus on the Chemistry substances of interest: eutrophication, acidification, contaminants, and marine litter. These datasets are then regularly harvested to provide input for the product groups in EMODnet Chemistry. The metadata and datasets are also discoverable and accessible via the dedicated EMODnet Chemistry Data Discovery & Access service, which can be reached by users via the Chemistry narrative at the EMODnet Portal. The CDI service also supports an OGC–WMS–WFS service that publishes maps of P36 chemistry variable groups. These maps are published in the EMODnet Map Viewer and documented in the EMODnet Product Catalogue. In the framework of the Horizon Europe Blue-Cloud 2026 project, an upgrade has been launched of the data cloud component of the SeaDataNet CDI Data Discovery and Access service. The cloud system has been modernised and optimised, for instance making the import and synchronisation process faster. As a consequence of the upgrade all directly connected data centres had to amend the configuration of their node software, which is an easy job and has been communicated to all technical contacts. In practice, there has been a good follow-up of this request, which was needed to facilitate import of new CDI submissions.
- The CDI metadata format has been expanded with a metadata tag for Open / non-Open. This has been developed as a dedicated working group of EMODnet Chemistry dealing with the data quality control protocol reviewed and updated the definition and limits for broad range checks. They identified the requirement for making a distinction in range checks for open and non-open water, determined by the 12 NM boundary. For that purpose, it is necessary to indicate for each CDI, whether the observation is located in the coastal zone between coastline and 12 NM boundary, or in open waters outside the 12 NM boundary, or covering both, which is possible for trajectory observations. Making use of inter alia the Marine Gazetteer (www.marineregions.com) as managed by VLIZ, a map filter of polygons was produced to divide the two zones. This filter has been applied to the full SeaDataNet CDI metadatabase and integrated in the CDI import procedure, so that all CDIs are tagged with the **location qualification** (Landward side of 12 NM boundary / Beyond the 12NM boundary / Both (landward sides + beyond the 12 NM boundary). The new metadata tag has also been implemented as a new search criterium. As a follow-up, the ODV software has also been adapted to facilitate the import of the full and expanded CDI metadata, so that the Regional Coordinators can make use of the new indicator for their QA-QC activities.

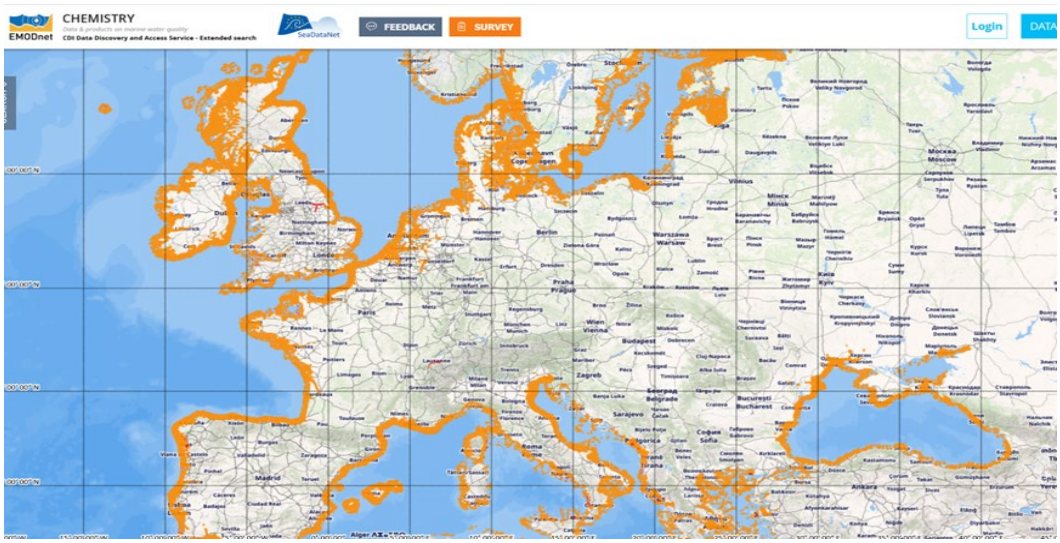

Figure: CDI – Chemistry user interface: illustration of a map with CDI locations in the coastal 12 NM zone

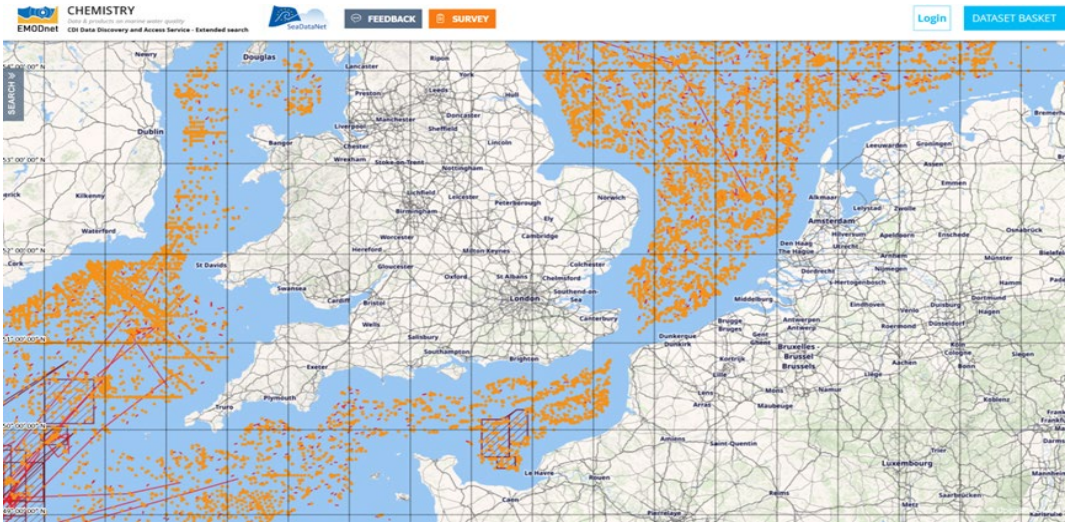

Figure: CDI – Chemistry user interface: illustration of a map with CDI locations in the open seas beyond the 12 NM zone

WP4.2: Further developing the EMODnet database system for marine litter and dynamic generation of marine litter maps

The EMODnet Chemistry database system currently supports three main data types: beach litter, seafloor litter (collected via fishing trawls), and floating micro-litter. Central databases for beach and seafloor litter are managed by OGS, while floating micro-litter data are handled using the CDI service and adapted ODV formats. All datasets are accessible through the CDI Data Discovery and Access service, with OGS generating CDIs and crediting data curators in the metadata. Aggregated datasets are produced in standardised formats and published, while periodic map products derived from beach and seafloor litter data are made available as a joint effort between OGS and IFREMER, with the latter ensuring publication through OGC WMS/WFS services.

Building on previous phases, WP4.2 also explored the inclusion of two new data types: floating macro-litter and seafloor litter from images and video. These developments were initiated in collaboration with TG-ML, which, along with DG Environment, recognises EMODnet Chemistry as the European reference for marine litter data management. OGS, in close cooperation with the EU JRC (co-chair of TG-ML), has continued to engage with Member States and international partners to advance methodologies for collecting and managing these emerging data types. A significant milestone was reached in October 2025 with the internal release of a first draft framework for managing seafloor imagery from ROVs, AUVs, and towed cameras. This release includes a prototype database, ingestion and validation services, and accompanying guidelines and templates, which are currently undergoing testing and refinement.

WP4.3: Improving the advanced viewing services

WebODV Explorer and Extractor service:

The WebODV Explorer and Extractor service, developed by AWI, continues to evolve as a powerful online tool for accessing and visualising EMODnet Chemistry's aggregated and validated data collections. Available at https://emodnet-chemistry.webodv.awi.de/, the service offers MSFD users and the scientific community with intuitive options for browsing, subsetting, and exporting datasets in various formats, supporting environmental assessments and scientific research. Researchers can explore the data as a "treasure box", generating visualisations such as oceanographic sections and parameter interpolations using the integrated DIVA tool, which is ideal for scientific analysis and publication. During the reporting period, the service was updated with the latest datasets on eutrophication and contaminants. WebODV also implemented OGC-

compliant GetCapabilities and GetMap functionalities, enabling the publication of selected maps via WMS/WFS protocols. These maps are now accessible through the EMODnet Map Viewer and are documented in the EMODnet Product Catalogue, enhancing visibility and user engagement. To further support users, AWI produced video tutorials, now available on the WebODV landing page.

Significant upgrades were also made to the ODV desktop software used by Regional Coordinators for QA/QC workflows. A new *Location Qualification* metavariable was introduced in version 5.8.2 (released 15 May 2025), allowing more precise metadata integration. This metavariable is now included in all new EMODnet data and has been retroactively applied to existing eutrophication and contaminant datasets using the global CDI metadata compilation provided by MARIS. This enhancement enables incremental updates, allowing regional leaders to focus their QA/QC efforts on newly harvested or updated data. Further improvements were made to the parameter aggregation and harmonisation tools within ODV. Method A (based on the P35 vocabulary) and Method B (based on P01 codes with unit harmonisation) can now both be applied to eutrophication datasets, significantly reducing the number of parameters and improving usability. These methods are now fully interoperable and can be applied in any sequence.

Both the desktop and web versions of ODV were also enhanced to support the exchange of graphical elements such as contour lines, data points, and values between browser tabs and local ODV instances. This enables seamless integration of multidisciplinary datasets and supports a wide range of analytical workflows. The updated ODV-online 'HowTo' guide illustrates four practical use cases with step-by-step instructions, all executable directly online without the need for software installation or data downloads.

One notable application is the overlay of trusted reference datasets onto new data for quality control. The figure below shows nitrate data from the Eastern Mediterranean requiring quality control (black data points in the data window and blue station locations on the map). Overlain in red are nitrate data from the CCHDO data centre (https://cchdo.ucsd.edu/), providing well-calibrated shipboard measurements for the same region. The reference data clearly facilitate the decision on which data should be flagged as questionable or bad.

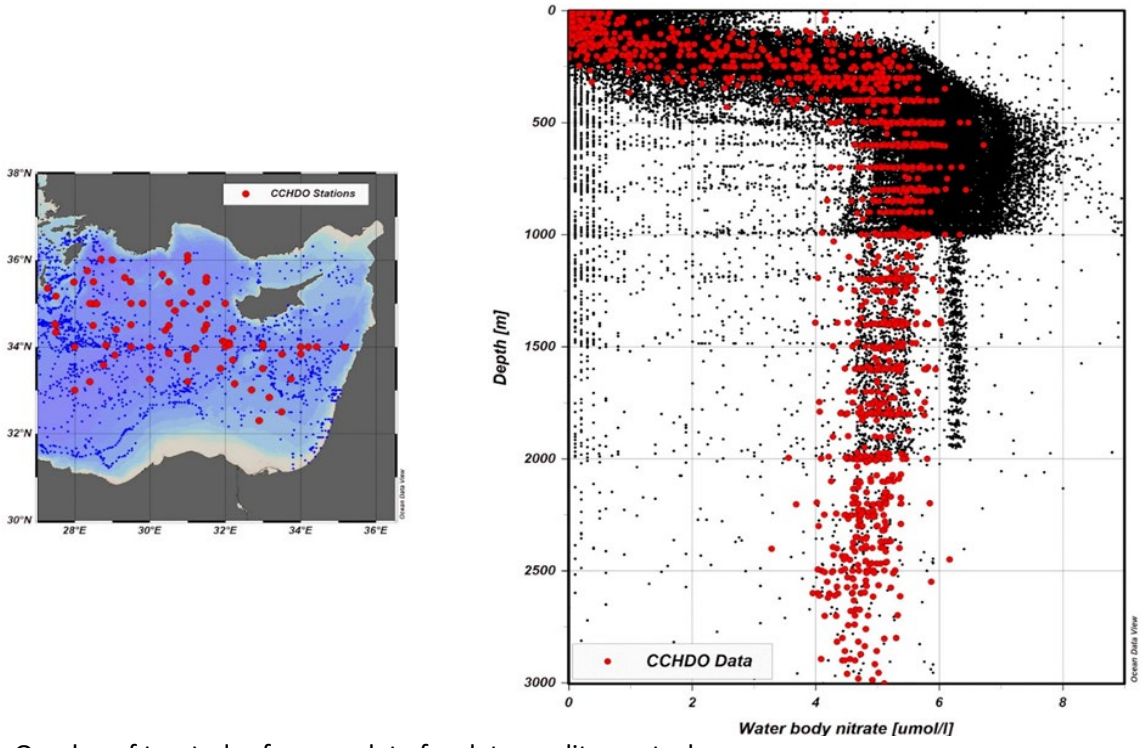

Figure: Overlay of trusted reference data for data quality control.

Exploring ERDDAP service:

Accessibility and interoperability of the EMODnet Chemistry validated and aggregated data collections for eutrophication, contaminants, beach litter, seafloor litter and floating microlitter has been improved through the use of an ERDDAP instance. Following an in-depth analysis, 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. Due to the large amounts of metadata present in the collections and coded through standard vocabularies, further work was needed to provide meaningful sets of information. Workflows for the different data types have been developed, specific for each type of dataset considering the data input format and the dimensions of the dataset; the datasets of eutrophication require particular actions to deal with the large size of the files. Special attention is given to the compilation of the metadata of the attributes to provide the adequate scientific meaning to the reported attributes. The task is completed with the visualization of the data points in the EMODnet Map Viewer through a GeoServer WMS; the getfeature info returns a minimum set of metadata of the station and the direct link to the data in ERDDAP. The OGS ERDDAP instance (https://erddap.emodnet-chemistry.eu/erddap/index.html) is now operational and gives access to validated data collections on eutrophication, beach litter, seafloor litter, and micro-litter, while activities are ongoing for beach litter and contaminants. The OGS ERDDAP service can be reached by users from the EMODnet Chemistry narrative section on the EMODnet Portal.

EMODnet European Marine Observation and Data Network

EMODnet Chemistry ERDDAP
Easier access to scientific data

English
Brought to you by EMODnet Ch

ERDDAP > List of All Datasets

17 matching datasets, listed in alphabetical order.

Grid DAP Data	Sub-set	Table DAP Data	Make A Graph	WMS	Source Data Files	Title	Sum-mary	FGDC, ISO, Metadata	Back-ground Info	RSS	E mail	Institution	Dataset ID
	set	data	graph			* The List of All Active Datasets in this ERDDAP *		M	background			NODC OGS	allDatasets
		data	graph		files	Eutrophication v2024 Arctic Ocean Profiles		F I M	background	RSS		EMODnet Chemistry	EUT_ARCTIC_PROFILES_2024
		data	graph		files	Eutrophication v2024 Atlantic Ocean Profiles		F I M	background	RSS		EMODnet Chemistry	EUT_ATLANTIC_PROFILES_2024
		data	graph		files	Eutrophication v2024 Atlantic Ocean Timeseries		F I M	background	RSS		EMODnet Chemistry	EUT_ATLANTIC_TIMESERIES_2024
		data	graph		files	Eutrophication v2024 Baltic Sea Profiles		F I M	background	RSS		EMODnet Chemistry	EUT_BALTIC_PROFILES_2024
		data	graph		files	Eutrophication v2024 Baltic Sea Timeseries		F I M	background	RSS		EMODnet Chemistry	EUT_BALTIC_TIMESERIES_2024
		data	graph		files	Eutrophication v2024 Black Sea Profiles		F I M	background	RSS		EMODnet Chemistry	EUT_BLACKSEA_PROFILES_2024
		data	graph		files	Eutrophication v2024 Mediterranean Sea Profiles		F I M	background	RSS		EMODnet Chemistry	EUT_MED_PROFILES_2024
		data	graph		files	Eutrophication v2024 Mediterranean Sea Timeseries		F I M	background	RSS		EMODnet Chemistry	EUT_MED_TIMESERIES_2024
		data	graph		files	Eutrophication v2024 North Sea Profiles		F I M	background	RSS		EMODnet Chemistry	EUT_NORTHSEA_PROFILES_2024
		data	graph		files	Eutrophication v2024 North Sea Timeseries		F I M	background	RSS		EMODnet Chemistry	EUT_NORTHSEA_TIMESERIES_2024
		data	graph		files	Floating Microolitter v2024		F I M	background	RSS		EMODnet Chemistry	FLOATING_MICROLITTER_2024
		data	graph		files	Seafloor litter v2024 Atlantic Ocean		F I M	background	RSS		EMODnet Chemistry	SEAFLOOR_LITTER_ATLANTIC_2024
		data	graph		files	Seafloor litter v2024 Baltic Sea		F I M	background	RSS		EMODnet Chemistry	SEAFLOOR_LITTER_BALTIC_2024
		data	graph		files	Seafloor litter v2024 Black Sea		F I M	background	RSS		EMODnet Chemistry	SEAFLOOR_LITTER_BLACKSEA_2024
		data	graph		files	Seafloor litter v2024 Mediterranean Sea		F I M	background	RSS		EMODnet Chemistry	SEAFLOOR_LITTER_MED_2024
		data	graph		files	Seafloor litter v2024 North Sea		F I M	background	RSS		EMODnet Chemistry	SEAFLOOR_LITTER_NORTHSEA_2024

Figure: ERDDAP service as deployed by OGS for Chemistry validated and aggregated data collections

WP4.4: Streamlining the process for generating and publishing contaminant maps

In the previous phase, HCMR has taken over the generation and publishing of contaminant maps, using OGC WMS -WFS services for exchange with the EMODnet Map Viewer. The maps are created using the open-source tool QGIS. In the reporting period HCMR has been working on refining contaminants maps and their statistics, as well as interacting with the CP team for publishing new releases of the maps but also adding filter options. The deployment is now fully operational.

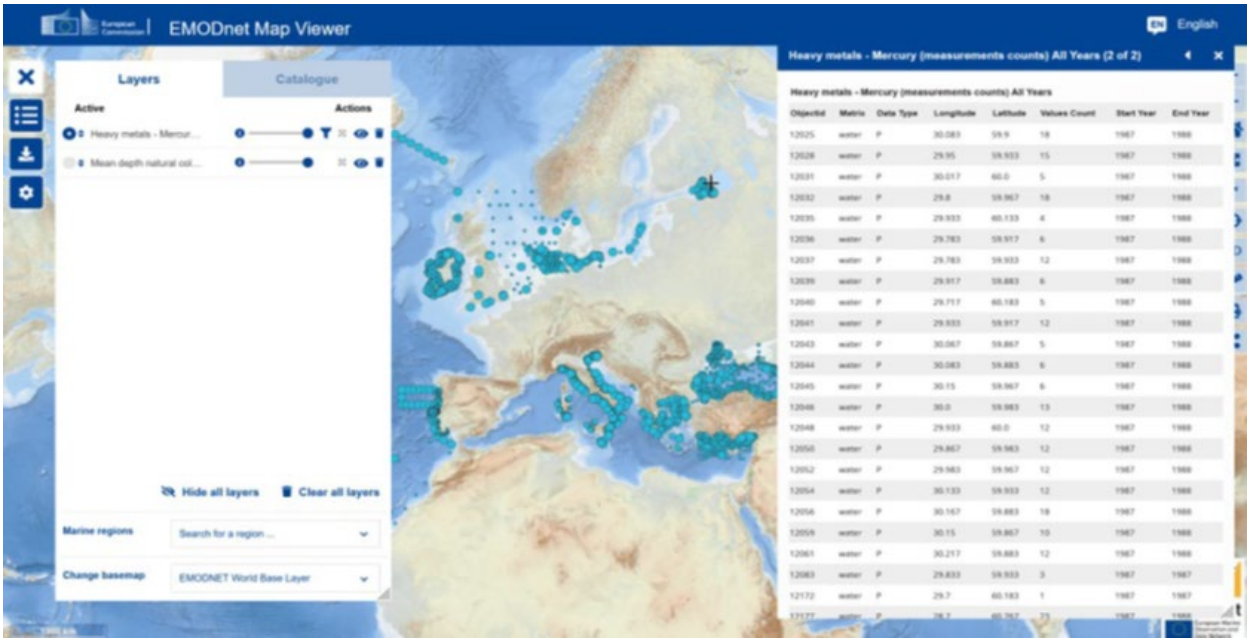

Figure: Contaminant map for heavy metals from the EMODnet Map Viewer, with filter options and table statistics displayed.

WP4.5: Operation and monitoring of well-functioning of services and gathering indicators

Since centralisation, the visualisation of the website is monitored via Europa Analytics and the EMODnet secretariat provides quarterly statistics. EMODnet Chemistry has been working on deploying a new tool (Greylog) to monitor the viewing and downloading of EMODnet Chemistry data products from their sources (notably Ocean Browser, IFREMER MapServer, HCMR GeoServer and DOI landing pages). The software has been shared and configured since Q2–2024 to produce the overall download statistics as presented in quarterly reports.

WP5 - Uptake, outreach and interaction

Covering Task(s): Task 6 - Ensure the involvement of RSCs, **Task 7 -** Contribute to the implementation of EU legislation and broader initiatives for open data, AND **Task 8** -Monitor quality/performance and deal with user feedback.

There are a number of complimentary activities that comprise this work package, a mixture of marketing of products and services, extending the reach of EMODnet and end user feedback and engagement (customer relationship management). The MSFD board of experts, helpdesk and ticketing system, direct interaction with expert networks and groups (MSFD and regional seas), and consolidated services to European data products (EEA for contaminants and eutrophication and JRC for marine litter) are the key contributions.

WP5.1: Maintain and operate a Help service – led by OGS

With the centralisation of EMODnet in January 2023, the functionality of the EMODnet Portal has been used for feedback. All requests are now tracked via Jira tickets and a record is kept of all requests received in the OGS system and the EMODnet Portal system. In accordance with ISO 9001 quality procedures, the recorded requests are analysed to develop frequently asked questions for publication on the portal and to provide indicators (e.g. helpdesk response time). The questions are categorised differently, e.g. immediate response, forwarding to internal experts for response and forwarding to consortium experts for response. During the reporting period, the OGS processed and completed 23 support and information requests. They mainly came from the helpdesk.

WP5.2: Interaction and regular dialogue with MSFD stakeholders - led by ICES

Since 2017, EMODnet Chemistry outreach to the MSFD experts for contaminants, eutrophication and marine litter has been formalised with the creation of the MSFD Board of Experts, with ICES maintaining regular dialogue on behalf of EMODnet Chemistry. The board now has an established presence on the EMODnet Central portal webpage. The role of the panel is to advise the consortium on the scope and definition of products and services from the perspective of the MSFD. The Board comprises over 50 participants from around 28 international research institutions, non-governmental organisations and regional, national and European government agencies. Four meetings with the MSFD Board of Experts were held during the two-year period:

- 31 May 2024 to present new developments of **webODV** and evaluate its further use by the RSCs. Detailed information on the event was published in the June release of EMODnet newsletter and in a full news piece;
- 4 February 2025 to present and discuss further improvements to the latest maps on the spatio-temporal distribution of contaminants;
- 24 March 2025 to present and discuss further improvements to the latest maps on the spatio-temporal distribution of marine litter;
- 29 September 2025 to present and refine new DIVA maps on key eutrophication parameters (*report pending publication*).

A survey was also created and distributed by ICES to the MSFD board of experts to better tune the list of chemical parameters and ancillary parameters to be included in the next harvest.

During the reporting period, EMODnet Chemistry maintained active dialogue with all RSCs through the MSFD Technical Groups and with the four RSCs directly. The EMODnet Open Conference and Jamboree 2023 took place, which was a fantastic opportunity to engage with the RSCs. In addition, EMODnet Chemistry participated in the online session of the MSFD Technical Group on Marine Litter (15 December), where all RSCs

met together with Member States to agree on ML reporting. EMODnet Chemistry plays a crucial role in the standardisation, collection and aggregation of marine litter data. The Consortium was also in the meeting of the MSFD Expert Group on Contaminants (7 February 2024) and worked closely with the JRC to prepare the data availability analysis, which was presented at the GES meeting on 15 April 2024. EMODnet Chemistry participated in the Working Group on Data, Information and Knowledge Exchange (WG DIKE) and the Technical Group on Data (TG Data), see more details in following paragraph. EMODnet Chemistry also participated in the MSFD Technical Group on Marine Litter 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 and welcomed.

The MSFD Technical Group on Data (TG Data) met on 27 September 2024 and discussed the role of EMODnet in data reporting according to Article 19(3) of the MSFD Directive. Surprisingly, the EEA proposed a workflow that does not include EMODnet to look at the available data and formats, while defining a data template. This proposal came out despite JRC confirming the voluntary adoption by Member States of EMODnet Chemistry as data platform for the collection of marine litter data, HELCOM confirmed the adoption of EMODnet platform for the collection of beach litter data in the Baltic sea, and JRC explained the work done in the analysis of EMODnet Chemistry eutrophication and contaminants data and metadata. Although EMODnet is not considered as the official data platform, several countries already include their MSFD monitoring data as part of the EMODnet Chemistry network. TG Data met twice in 2025 (March and October) with attendance by representatives from EMODnet Chemistry, Biology and the EMODnet Secretariat. The chairs of TG Data (EEA and Italy) have made some progress in collecting information on standards and formats that RSC's are using for the focus MSFD descriptors (D5 Eutrophication and D8 Contaminants. The work is not yet finalised and interventions on the use of infrastructure and processes that are established and working i.e. RSC dataflows that feed ICES-EMODnet dataflow to EEA. EMODnet Chemistry will continue to engage with TG Data in 2026 and help align understanding among the member countries, RSC's, EEA and Commission.

WP5.3: Data preparation for EEA indicators on Hazardous substances in biota and eutrophication

Following EEA deadlines, EMODnet Chemistry aligns with ICES activities to support the computation of indicators for periodic EEA marine indicators used to evaluate efficiency of MSFD, Zero Pollution Action Plan, UN Agenda 2030 and other initiatives. Data compiled from EMODnet chemistry and ICES and EEA (EIONET) are used to update the indicators on:

- Hazardous substances in marine organisms (MAR001)
- Nutrients in transitional, coastal and marine waters (MAR005)
- Chlorophyll in transitional, coastal and marine waters (MAR006)
- Oxygen concentrations in coastal and marine waters surrounding Europe (MAR012)

The data integration for EEA indicators are following up on previous support for EEA indicators and continuation of dataflows established for the update and publication of these. The EEA indicators are generally updated annually and EMODnet regional harmonisation processes have been aligned with this, so that quality assured datasets from EMODnet chemistry are available for processing around end May each year.

EMODnet chemistry data are particularly supplementing data from the Black Sea and Mediterranean Sea compared with ICES data.

4 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**
Monitor new Chemistry webservices, on new server (EM-887, 2023-11-14)	Resolved	Chemistry webservices list updated	n.a.	07/12/2023
Upgrading GeoServer (EM-905, 2023-12-09)	Resolved	Updated	n.a.	04/12/2023 (MARIS) 05/01/2024(HCMR)
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.	03/10/2024
Thematics to review the guidelines document on metadata harmonisation (EM-1004)	Resolved	Guidelines reviewed	08/10/2024	30/09/2024
Chemistry to provide input to the Tools & Guidelines section (EM-640)	Resolved	Input provided	n.a.	29/08/2025
Chemistry - EMODnet Catalogue Tags (EM-533 and EM-612)	Resolved	Tags provided	n.a.	010/04/2024
EMODnet lots to check if filter values are displayed in the preferred order (EM-957)	Resolved	Filter values checked	n.a.	10/01/2025
Creating a list of new features for the next release of MapViewer (EM-1042)	Resolved	Provided a list of new features for the next release of MapViewer	27/01/2025	02/10/2025
Subset and download tool is not working for Chemistry "measurement count" layers - WFS link are misconfigured (EM-1165)	Resolved	Fixed the problem	n.a.	06/08/2025
Change WFS URL from ERDDAP to GeoServer (eutrophication data collections) (EM-1180)	Resolved	OGS and ULiege explained that converting tabledap into griddap makes no sense as we are talking about vectorial/point data; Chemistry is already providing an interoperable service for the data collections through ERDDAP.	n.a.	01/10/2025

The Transcopyright url used in the Access and use constraints leads to a gambling website (EM-1168)	Resolved	Wrong URLS of data products were corrected	n.a.	08/08/2025
Chemistry Quality of Service Monitoring (EM140>EM-144)	Resolved	Chemistry provided justification for the downtown event	n.a.	28/07/2024
V2024 contaminants layers updates (EM-1049)	Resolved	Updated the layers	n.a.	01/10/2025
webODV branding (EM-1175)	Pending	Chemistry asked for existing guidelines or references that define the requirements for using the EMODnet branding	n.a.	
Chemistry to provide deadline by when metadata records can be adapted to meet the guidelines (EM-1073)	Pending	This request still requires the following steps to be completed: identifying and defining the values to add to the SeaDataNet vocabulary, requesting the update of the vocabulary from the BODC, updating the vocabulary in GeoNetwork (development is needed), and updating the existing metadata. A request to the Secretariat is still pending in the ticket.	n.a.	
Chemistry videos (EMODCOM-231)	Pending	Under development	n.a.	

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**
Chemistry Beach Litter - Grouping layers on the CP (EM-704, 2023-01-04)	Resolved	Limited the number of layers	n.a.	19/10/2023
As requested by the MSFD expert panel. IFREMER is asked to change the name of the subfolder under the "Beach Litter" folder in the litter web services under Chemistry from "Official monitoring" to "EU-	Resolved	Changed the name	n.a.	27/11/2023

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**
MSFD monitoring (EM-895, 2023-11-24)				
Map Viewer - add new Subfolder for Chemistry - webODV maps (EM-894)	Resolved	Subfolder added	n.a.	06/05/2024
Tailor zoom-out coverage in map viewer (EM-1078)	Resolved	Improved the zoom function	n.a.	13/6/2025
View and Download in the Products Catalogue (EM-963)	Resolved	GeoNetwork upgraded to a newer version	n.a.	05/2025
Request to CP Team to change the naming of some map layers for Chemistry because of changes in P36 vocabulary (EM-1164)	Resolved	Changed the name	08/08/2025	06/08/2025
Improvements in the map viewer (EM-1088)	Pending		n.a.	
No possibility to change the color scale in the climatologies (EM-743)	Pending	CP team will possibly add this as a new development to the viewer (in 2025), if it follows an OGC standard (STYLE or COLORSCALERANGE)	n.a.	
Products download in the Map Viewer (EM-962)	Pending	CP team will discuss it and come back to Chemistry on this (15/04/2024)	n.a.	
New EMODnet Chemistry product (EM-1152)	Pending		n.a.	

5 Allocation of project resources

Overview of resource usage (percentage of project resources) since the start of the project phase (03/10/2023) in achieving the main objectives and tasks of the project, divided into the following categories:

Information on the allocation of project resources	
Categories	Resource usage[1] (%)
Making data and metadata interoperable and available	42.08
Preparing data products	27.31
Preparing web-pages, viewing or search facilities	15.80
Managing user feedback	3.24
Project management	6.71
Outreach and communication activities	4.86
TOTAL	**100.00**

[1] Provide the workings of your calculations, *i.e*. percentage allocation of the total amount awarded.

6 User feedback

Overview of user feedback and/or requests received in this project phase							
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
03/10/2023	VLIZ	Estuary litter data in EMODnet	Email to nodc@ogs.it	10 minutes	Resolved	Provided the requested information via email	
12/10/2023	EC DG MARE.	Request for a summary of what data exist in EMODnet for the Southern Ocean and any other links EMODnet has with the Southern Ocean.	EMODnet help desk	2 hours	Resolved	Provided the requested information via Jira ticket EMODNET-1703	
12/10/2023	IOF	Submission of Croatian beach litter data for years 2021 and 2022.	Email to info@emodnet-chemistry.eu	2 hours	Resolved	Checked data, asked and received further information from IOF	
29/10/2023	University of Trieste	Information about the EMODnet service on coastal type	Email to nodc@ogs.it	1 hour	Resolved	The contact was informed about the EMODnet centralisation and the continuation of the EMODnet Geology catalogue - Coastal Behaviour - Coastal Type	

Overview of user feedback and/or requests received in this project phase							
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04/12/2023	PhD student (scientist and data analyst)	Help to access and download marine data through the website emodnet-chemistry.webodv.awi.de	EMODnet Help desk	1 hour	Resolved	Provided support via Jira ticket EMODNET-1740	
13/12/2023	Albanian Geological Survey	interest in contributing to EMODnet with data to EMODnet in an easy and more flexible way.	EMODnet Conference 2023	1 hour	Resolved	Provided information on EMODnet Chemistry and Ingestion via email from info@emodnet-chemistry.eu	
13/12/2023	Swedish Environmental Protection Agency	Enquiry on the progress of the flow of Swedish micro-litter data from ICES 23DOME to EMODnet	Email to info@emodnet-chemistry.eu	1 hour	Resolved	The OGS has liaised with ICES, who has informed the contact person about the status of the workflow and the upcoming deadline for the delivery of the ICES DOME data to EMODnet.	
12/01/2024	NO-Profit organisation 'Venice Lagoon Plastic Free"	Provision of beach litter data	Email to info@emodnet-chemistry.eu	1 day	Resolved	The OGS received the data and asked for clarification, then entered the data into the DB.	

Overview of user feedback and/or requests received in this project phase							
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
21/02/2024	Anonymous user	General info on EMODnet Chemistry offer	EMODnet Chemistry helpdesk via Jira ticket EM-1768	6 days	Resolved	OGS provided info on Chemistry offer	
26/02/2024	Department of Fisheries and Marine Research (DFMR), Ministry of Agriculture, Rural Development and Environment (Cyprus)	Provision of Cyprus seafloor marine litter (MEDITS) data	Email to info@emodnet-chemistry.eu	2 days (first OGS feedback.)	Resolved	The OGS received the data and asked for adjustments	After several email exchanges with the data providers, it was clear that the data provider did not have the experience to make the corrections requested by OGS. As suggested by OGS, the data provider sent the data to the Cypriot EMODnet Chemistry NODC, which is responsible for submitting it to OGS.
24/01/2024	European Commission via	Comments and suggestions to improve the Nitrates Directive	Email to agiorgetti@ogs.it	1,5 days	Resolved	On 5 March, OGS sent the EC questionnaire to carry	

Overview of user feedback and/or requests received in this project phase							
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
	EMODnet Secretariat					out a consultation on Nitrates Directive	
20/02/2024	Illuminum IT company	Baltic Sea Environmental Data for Shiny Application	Email to info@emodnet-chemistry.eu	5 days	Resolved	OGS provided in-depth information on EMODnet Chemistry data availability	
28/02/2024	Scientist	Data for a scientific project in the Basque country	Email to info@emodnet-chemistry.eu	1 day	Resolved	OGS provided in-depth information on EMODnet Chemistry data availability	
29/02/2024	Anonymous user	General info on EMODnet Chemistry offer	EMODnet Chemistry helpdesk via Jira ticket EM-1773	12 hours	Resolved	OGS provided info on Chemistry offer	
11/03/2024	Royal Belgian Institute of Natural Sciences (RBINS)	Request for text and images for EMODnet ingestion use cases related to marine litter	Email to caltobeli@ogs.it	1 day	Resolved	Provided the requested material, which was used for the new video of EMODnet Ingestion	
13 March 2024	Spanish Institute of Oceanography (IEO)	Clarification request: confusion in the documentation of the Marine litter manager tool regarding the coordinate format in the output file	Email to info@emodnet-chemistry.eu	10 minutes	Resolved	The wrong info on the coordinate format in the output file as specified in the Marine Litter Manager Tool manual was clarified.	

Overview of user feedback and/or requests received in this project phase							
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
21/03/2024	EC JRC	Clarification request on marine litter data collections	Email to nodc@ogs.it		Resolved	OGS clarified	
26/03/2024	University of Malaga	Issues in surface marine litter data for the Western Mediterranean and the Gulf of Cadiz, downloaded from the EMODnet database.	Email to info@emodnet-chemistry.eu	1 day	Resolved	OGS provided clarity and once again pointed out to the data providers the problems that the University had also identified	
27/03/2024	VLIZ	Proposed EMODnet Chemistry contribution to the NECCTON consortium living document: adding comments on the parameter standard and on the long names and units	Email to info@emodnet-chemistry.eu	12 hours	Resolved	EMODnet Chemistry has agreed to contribute to this document	
27/03/2024	NECCTON consortium	Provide Chemistry expertise to biodiversity data product harmonisation	Email to info@emodnet-chemistry.eu	1 day	Pending	EMODnet Chemistry for the Consortium to share a document, which Chemistry should review	
29/05/2024		Request to change the licence of the beach litter data of Latvia in period	Email to info@emodnet-chemistry.eu	16 hours	Resolved	OGS updated the data policy in the database.	

Overview of user feedback and/or requests received in this project phase							
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		2015-2018 from "by negotiations" to "Creative Commons Attribution 4.0 International"					
31/05/2024	CEDRE	Request not to use and publish some beach litter data	Email to info@emodnet-chemistry.eu	5 hours	Resolved	OGS did not consider these data when preparing the data collections and the related data products.	
10/06/2024	State Agency for Environment, Nature Conservation and Geology, Mecklenburg-Vorpommern	Provide a set of beach litter data of 2022 and 2023 (and some additional older data) from German Baltic Sea beaches and obtain feedback from OGS that the data are correct and included in the DB	Email to info@emodnet-chemistry.eu	21 hours	Resolved	OGS has double-checked the data submission, added it to the DB and informed the data providers about it	
02/07/2024	Aplinkos Apsaugos Agentura	Provide the data for the monitoring of beach litter in Lithuania for the year 2022 and obtain feedback from OGS that the data are correct and included in the DB	Email to info@emodnet-chemistry.eu	1,5 hours	Resolved	OGS has double-checked the data submission, added it to the DB and informed the data providers about it	

Overview of user feedback and/or requests received in this project phase							
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
04/07/2024	ICES	Fixing a meeting to progress with data flow from ICES marine litter DB to EMODnet MLDB.	Email to info@emodnet-chemistry.eu	5 minutes	Resolved	The latest results and the measures required in the future were presented by ICES at the EMODnet Chemistry PFG meeting on 23 and 24 September 2024.	
08/07/2024	Spanish Institute of Oceanography	Inform Chemistry that the link to the beach litter validator is missing in the narrative web page and it would be very helpful	Email to info@emodnet-chemistry.eu	1 day	Resolved	OGS inform that EMODnet Chemistry submitted an in-depth revision of the Chemistry narrative, including the link to the marine litter validators	
18/07/2024	IEO-CSIC	Provide the data for beach litter collected by the Ministry for the Ecological Transition and the Demographic Challenge (MITECO) during 2023 and obtain feedback from OGS that the data are correct and included in the DB	Email to info@emodnet-chemistry.eu	3 hours	Resolved		

Overview of user feedback and/or requests received in this project phase							
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
18/09/2024	Scientist	Issue to download the eutrophication data provided by EMODnet	Email to info@emodnet-chemistry.eu	3 days	Resolved	OGS explained that the aggregated data collections of EMODnet Chemistry are not yet available in the map viewer. OGS also informed the user how to access them.	
23/09/2024	Anonymous user of the EMODnet Portal	Request information about access to data	Jira Ticket EMODNET-1869	5 hours	Resolved	Provided detailed information about access to measurement data and data collections	
03/10/2024	Tokyo Metropolitan University	Information on data monitoring and sharing of micro/macrolitter	nodc@ogs.it	1 hour	Resolved	OGS suggested to 1) follow the upcoming workshop on this matter organised by the Ministery of Environment, Japan and 2) have a look at the EMODnet portal to understand more about marine litter data management.	

Overview of user feedback and/or requests received in this project phase							
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
20/11/2024	Scientist	Data request for Saudi-Arabia coastal water quality	Email to info@emodnet-chemistry.eu	3 hours	Resolved	OGS provided a basic query to access the data via EMODnet portal	
20/11/2024	Scientist	Retrieve in situ data via EMODnet wfs Rpackage from C1 station in Gulf of Trieste	Email to info@emodnet-chemistry.eu	45 minutes	Resolved	OGS provided information on how to obtain both aggregated and validated data and measurements. OGS also informed about the ongoing problems with the data access service due to the weather emergency affecting the data server room. OGS apologised for the inconvenience. (The problem was solved shortly afterwards)	
17/01/2025	Data provider from Environmental Protection Agency (Lithuania)	Submission on marine litter data with related issues to be solved	Email to info@emodnet-chemistry.eu	5 days	Resolved	The OGS clarify some doubts of the data provider, then draw her attention to some issues to be resolved and indicate where the	

Overview of user feedback and/or requests received in this project phase							
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
						information can be found, i.e. the Guidelines and forms for gathering marine litter data: beach and seafloor trawlings	
04/02/2025	Umweltbundesamt (UBA, the environment agency of the German government)	Questions on heavy metal data (Pb and Cd) in EMODnet Chemistry	Jira Ticket EMODNET-1966	1 day	Resolved	OGS answered all questions	
12/02/2025	ISPRA, Italy	The data provider needed to re-submitt beach litter data due tue a detected error.	Email to info@emodnet-chemistry.eu	1 day	Resolved	The OGS has shown the data provider how best to proceed to update the data without resubmitting all the information.	
27/02/2025	Mediterranean Information Office for Environment, Culture and Sustainable	Support to submit beach macrolitter datasets via EMODnet Ingestion and Chemistry	Redirected from Data Ingestion submission service to info@emodnet-chemistry.eu	4 days	Resolved	OGS guided the data provider until its data were made available via EMODnet Chemistry	

Overview of user feedback and/or requests received in this project phase							
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
	Development (NGO from Athens, Greece)						
12/03/2025	A scientist working with Bantry Marine Research Station and partners on a project commissioned by CINEA and DG MARE evaluating the potential for extractive aquaculture in the North Sea and Baltic	Contaminants in seawater data - units query	Jira Ticket EMODNET-1986	2 days (first response)	Resolved	In the two weeks following the enquiry, detailed information was provided by OGS and AU-DCE by email to resolve the issues identified by the user in the file 'Contaminants_NorthSea_water_profiles_2024_unrestricted_transposed.txt'.	
19/03/2025	University of Montenegro, Institute of Marine Biology	Information request to submit microlitter data in sediment and solve issues with H03 vocabulary	Email to info@emodnet-chemistry.eu	1 day (first response)	Resolved	In the ten days following the request, detailed information was provided by email on how to submit data and contact BODC in the	

Overview of user feedback and/or requests received in this project phase							
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
						event of changes to the H03 vocabulary	
25/03/2025	Researcher at The Ocean Cleanup, a Dutch-based NGO	How to submit sea-surface plastics data	Email to info@emodnet-chemistry.eu	Not applicable	Resolved	Taco de Bruin from NIOZ informed the OGS that he had already spoken to the NGO representative as well as the OGS and MARIS to organise a meeting shortly after the EMODnet Ingestion plenary meeting.	
10/04/2025	Researcher at the Oceanographic Institute of the University of São Paulo	Invitation to participate in the study “Citizen science for marine litter”	Jira Ticket EMODNET-2012	1 day	Resolved	OGS, as coordinator of EMODnet Chemistry, has made itself available for participation in the study	
16/04/2025	FEED AND ADDITIVES GmbH, Munich (Germany)	Searching for data regarding the content of the European marine sediment of some trace elements (e.g. zinc per kg marine sediment)	Jira Ticket EMODNET-2017	2 days	Resolved	OGS stated that no specific maps on Zinc are available, but data can be found in the aggregated data set for contaminants	

Overview of user feedback and/or requests received in this project phase							
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
22/04/2025	Oxfordresearch Latvia	In order to carry out an ex-post assessment of the implementation of the SUP Directive in Latvia, Request information on when the 2022-2024 beach litter data for Latvia will be published	Jira Ticket EMODNET-2020	6 hours	Resolved	OGS explained that EMODnet Chemistry will make these data available through its data access services as soon as they are made available by the Member State	
30/04/2025	SMHI-Swedish Meteorological and Hydrological Institute	Request for help in submitting beach litter data to Chemistry. They were received from "Keep Sweden tidy" through Emodnet ingestion	Email to info@emodnet-chemistry.eu	6 days	Resolved	The first response from OGS came on 6 May, but this feedback required an intensive exchange of emails, which was completed on 10 June	
9/05/2025	VITO, a research institute (Belgium)	Request for data on concentrations of uranium and boron in marine waters of the North Sea	Jira Ticket EMODNET-2033	3 days	Resolved	OGS provided full information on how to dowload the requested data	
23/05/2025	Syke Finnish research institute	Suke problems to send Finnish data to EMODnet Chemistry	Email to info@emodnet-chemistry.eu	3 days	Resolved	OGS provided full information	

Overview of user feedback and/or requests received in this project phase							
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
16/06/2025	Deltares	Request for removing an entry from the Product catalogue	Jira Ticket EMODNET-2059	3 days	Resolved	OGS removed the entry	
18/06/2025	Rijkswaterstaat-RWS, Netherlands	Request for clarification on the Microplastic data reporting format	Email to info@emodnet-chemistry.eu	20 hours	Resolved	This feedback required an intensive exchange of emails, which was completed on 19 June	
03/07/2025	Ministry of Innovation and Technology (MinT), Ethiopia	Request for clarity regarding the EDMO catalogue registration	Email to info@emodnet-chemistry.eu	4 hours	Resolved	OGS provided full information	
09/05/2025	VITO research institute (Belgium)	Question on how to share data with EMODnet Chemistry and access data	Jira Ticket EMODNET-2033	2 days	Resolved	OGS provided preliminary information and availability for further clarification	
26/05/2025	Syke (Finland)	Missing Finnish data	Email mmolinajack@ogs.it	1 hour	Resolved	The OGS explained that the problem is outside its area of responsibility as it concerns the migration of the replication manager	

Overview of user feedback and/or requests received in this project phase							
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
	Deltares (Netherland)	Request for removing an entry from the catalogue	Jira Ticket EMODNET-2059	3 days	Resolved	The entry has been removed from the catalogue	
22/07/2025	The Spring Charter, a nonprofit organization	Inquiry on marine litter data layers	Jira Ticket EMODNET-2075	6 hours	Resolved	The OGS provided full information	
06/08/2025	ULiege (France)	Difficulties accessing EMODNET data	Jira Ticket EMODNET-2089	2 hours	Resolved	The OGS provided full information	
05/09/2025	VLIZ (Belgium)	Request for clarification on congestion of marine litter data	Email to mvinci@ogs.it	3 days	Resolved	The OGS provided full information	
26/09/2025	+ATLANTIC (Portugal)	Request for being included in the EMODnet Chemistry board of experts on the MSFD	Email to info@emodnet-chemistry.eu	7 days	Resolved	OGS added the stakeholder to the board of experts mailing list	

7 Meetings/events held/attended & planned

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
2-5/10/ 2023	La Jolla, (US)	Workshop	Yes (general EMODnet presentation)	A	Workshop for low-cost technologies, Deep Ocean Collective Solution Accelerator
5/10/2023	online	Internal meeting	Yes (webODV new layers for EMODnet map viewer)	O	EMODnet Chemistry webODV layer in the CP Participants: OGS, AWI, SMHI, NIMRD, MARIS, AU-DCE, IFREMER, IMR, HCMR
11/10/23	web	Internal meeting	No	A	BlueCloud 2026 - TSC meeting – EMODnet is a prime BC stakeholder
11/10/2023	online	External meeting	Yes (General EMODnet presentation)	A	Seeked collaboration opportunities with the REMEDIES project
11-12/10/203	Brussels (Belgium)	Conference	Yes (marine litter)	A	EUROqCHARM final conference Bringing EMODnet Chemistry experience as a marine litter data manager Participants: 80 participants and 26 speakers
12/10/2023	online	Workshop	Yes (EMODnet Chemistry: Open and trusted data, products, and services for understanding the evolution of marine water quality)	A	Ocean Best Practices System (OBPS) Workshop VII. Showed the extensive participation of EMODnet Chemistry to the OBPS and illustrated the new “questionnaire” for QC.
16/10/2023	online	External meeting	No	A	Meeting of the Scientific Committee of the “Zéro Déchet Sauvage” citizen science programme.

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Discussion on future developments of the platform which could feed the NGO module of EMODnet.
18/10/2023	online	External meeting	No	A	During the EMODnet TWG meeting, participants engaged in thematic exchanges, bringing forth innovative perspectives and ideas that are set to shape the future of EMODnet.
20/10/2023	online	External meeting	Yes (EMODnet Chemistry data and services for Eutrophication)	A	(8th) EMODnet-Copernicus Marine Service coordination meeting
26-27/10/ 2023	Valencia (Spain)	Workshop	Yes (General EMODnet presentation)	A	EMODnet presentation at Erasmus Maris Days. Seeking collaboration opportunities
26/10/23	Genova, Italy	workshop	Yes (General EMODnet presentation)	A	Science Festival – EMODnet was presented during some of the activities with citizens
31/10/2023	Constanta (Romania)	External/Workshop	Yes (poster and leaflets)	O	"Blue Growth Initiative for Research and Innovation in the Black Sea '' workshop jointly organised by NIMRD, GeoEcoMar and Ovidius Constanța University to celebrate the Black Sea International Day. EMODnet Chemistry and EMODnet Ingestion were promoted by means of posters and leaflets.
07/11/2023	Rome (Italy)	External meeting	No	A	First meeting of the Italian Data Steward Community and the Competence Centre of the Italian Computing and Data Infrastructure.

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					OGS talked about EMODnet Ingestion as a simplified system to facilitate data submission and the workflow set up to make data managed by the different lots and accessible on the EMODnet CP.
7-9/11/2023	Rome (Italy)	External meeting	No	A	Blue-Cloud 2026 General Assembly Strengthen the collaboration between EMODnet Chemistry and Blue Cloud 2026
15-17/11/2023	Venice (Italy)	Conference	Yes (Ocean Acidification)	A	Themes 2023 International conference
16/11/2023	Online	External meeting	No	A	Current status of the EDITO platform
27-30/11/2023	Brussels (Belgium)	External meeting	Yes (4)	A	EMODnet Jamboree and an Open Conference Participants: over 340 partners, associated partners, and stakeholders.
28/11/2023	Brussels	Internal meeting	Yes (many, specific per WP)	O	KOM for the continuation of EMODnet Chemistry phase 5 from October 2023 to October 2025 Participants: 45 Discuss the future of the project with the full project group
01/12/2023	Brussels	Internal meeting	No	A	EMODnet SC
06/12/2023	Hybrid event held at the		No	A	JPI Oceans Small particles, big concerns: Marine microplastics revisited. Organised by oceans with EP Intergroup on "Climate

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
	European Parliament				Change, Biodiversity and Sustainable Development" and MEP Catherine Chabaud. Participants: ML experts and EU policy makers Fostering a comprehensive understanding of the challenges posed by microplastics in our marine ecosystems and to catalyse collective action.
12/2023	online	Training	Yes (SeaDataNet Data Discovery Access Service)	A	Blue Cloud 2026 training on SeaDataNet Data Discovery Access Service. Participants: 69 EMODnet Chemistry mentioned as an example of user tailored SDN DD&AS
25/01/2024	online	External meeting	No	O	EMODnet Chemistry statistics on visualisations and download of data products Participants: OGS and Laseroame IT company Drafted the structure of a Graylog system for EMODnet Chemistry
30-31/01/2024	Trieste (Italy)	Training	Yes (many per each topic related to data population)	O	EMODnet Chemistry training on data submission from data providers (data/metadata formats, vocabularies, guidelines, tools, services etc.). Training new data managers from the organisations that are part of the EMODnet Chemistry network of data providers. Strengthen the obligation of data providers to submit all available data.

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
05/02/2024	online	External meeting	No	O	EMODnet Chemistry statistics on visualisations and download of data products Participants: OGS and Laseroame IT company Set up the central OGS Graylog system for EMODnet Chemistry with different configuration to receive the log files from each data provider
07/02/2024	online	Internal meeting	No	O	Working group on handling methods about marine litter data Participants: BODC, OGS, ICES Discussed BODC idea for handling methodologies and requirements from the marine litter community, and corrected some existing P01 terms (pH). Discussed the possibility to handle more complex methodologies.
15/02/24	Online	External meeting	No	A	Meeting with DG Mare on EMODnet Chemistry data and data products Participants: OGS and DG MARE OGS has shown to DG Mare that most of the expected data products are already available and some changes will be made to better describe the products in the Map Viewer. Further products or improvements to the current ones have been favourably noted by OGS and will be discussed internally at the

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					next EMODnet Chemistry SC meeting (19/04/2024) and then at the next meeting with the board of MSFD experts
18-24/02/2024	New Orleans (USA)	External meeting	No	A	Ocean Science meeting of the American Geophysical Union (AGU) Participants: almost 6,000 attendees worldwide Long-term data series (1998–2023) of physical and biogeochemical parameters were analysed to assess trends and variability in oceanographic conditions along the eLTER-Senigallia transect (https://elter-ri.eu/) in the North Adriatic Sea (Mediterranean Sea). This analysis aimed to highlight and enhance our understanding of anomalies in physical processes, including seasonal and interannual changes (i.e. temperature, salinity, density, dissolved oxygen, and nutrients) that may be due to climate change.
20/02/24	Online	External meeting	No	O	Meeting with DG Mare on EMODnet Chemistry data and data products. Participants: OGS, HCMR, DG MARE OGS and HCMR has presented in detail to DG Mare that most of the expected data products for contaminants are already available and some changes will be made to better describe

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					the products in the Map Viewer. Further products or improvements to the current ones have been favourably noted by OGS and HCMR and will be discussed internally at the next EMODnet SC meeting (19/04/2024) and then at the next meeting with the board of MSFD experts
24/02/2024	Online	Internal meeting	No	O	EMODnet Chemistry monthly meeting on data products Participants: EMODnet Chemistry regional coordinators (AU-DCE, HCMR, IFREMER, IMR, NIMRD, SMHI) AWI, ICES, MARIS, and OGS. Reviewed the progress of the 1st data collection and determined the next steps to fulfil the EEA deadline
28/02/2024	Webinar	External meeting	No	A	Webinar about "EMODnet for Horizon Europe and EU Mission: Restore our Ocean and Waters projects" Participants: EMODnet, EC DG MARE, CINEA and representatives of European projects that are collecting in-situ marine environmental data. Guidance on fulfilling contractual obligations and highlights the benefits of contributing data to EMODnet, impacting initiatives like the EU

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Digital Twin Ocean and supporting global efforts such as the UN Ocean Decade.
01/03/2024	online	External meeting	Yes	A	International Expert Meeting on Marine Plastic Litter Monitoring Data Sharing Project, MOEJ Participants: members of the specific group of experts brought together by the Marine Plastic Litter Monitoring Data Sharing Project of the Ministry of the Environment, Japan.
05/03/2024	online	External meeting	No	O	EMODnet Chemistry statistics on visualisations and download of data products Participants: OGS and Laseroame IT company Set up the central OGS Graylog system for EMODnet Chemistry with different configuration to receive the log files from each data provider
12/03/24	Online	External meeting	Yes (Improvement in the Map Viewer and the Products Catalogue)	A	EMODnet Technical Working Group Improvements in the Map Viewer and the Products Catalogue
15/03/2024	Online	External meeting	No	A	Contribution to EDITO-Infra Participants: EMODnet Secretariat, VLIZ, EMODnet Coordinators Updates on EDITO project current status and developments, also in connection with EMODnet.

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
18/03/2024	Online	External meeting	No	A	MSFD Technical Group on Marine litter internal meeting Participants: MSFD TGML working group and invited experts on marine litter monitoring and data management. Discussed beach mesolitter fragments and pellets monitoring
21/03/2024	Online	External meeting	No	A	MSFD Technical Group on Marine litter internal meeting Participants: MSFD TGML working group and invited experts on marine litter monitoring and data management. Discussed seafloor litter thresholds
22/03/2024	Online	Internal meeting	No	O	EMODnet Chemistry monthly meeting on data products. Participants: EMODnet Chemistry regional coordinators (AU-DCE, HCMR, IFREMER, IMR, NIMRD, SMHI) AWI, ICES, MARIS, and OGS. Reviewed the progress of the 1st data collection and determine the next steps to fulfil the EEA deadline
22/03/2024	Online	External meeting	No	A	MSFD Technical Group on Marine litter internal meeting Participants: MSFD TGML working group and invited experts on marine litter monitoring and data management.

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Discussed MSFD Threshold Values for Seafloor Macro Litter (Observation + Imaging)
27/03/2024	Online	External meeting	No	A	MSFD Technical Group on Marine litter internal meeting Participants: MSFD TGML working group and invited experts on marine litter monitoring and data management. General discussion on coastline Litter Trends
02-05/04/2024	Malta	External meeting	Yes (Processing Marine Litter submissions by OGS)	A	Plenary Meeting of EMODnet Ingestion Discussed latest developments for the current contract and further activities for the contract extension with another two years.
05/04/2024	online	External meeting	No	O	EMODnet Chemistry statistics on visualisations and download of data products. Participants: OGS and Laseroame IT company Set up the central OGS Graylog system for EMODnet Chemistry with different configuration to receive the log files from each data provider
5/04/2024	online	External meeting	No	A	EMODnet Vision 2035 Drafting Group Meeting
8-9/o4/2024	Barcelona, Spain	External meeting	No	A	GOOS Regional Alliance Forum- XI Participants: 54 Discussed progress and challenges of the GOOS Regional Alliance (GRA) over the last two to three years; Examine how GRAs are

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					contributing to the UN Ocean Science Decade for Sustainable Development, the GOOS Strategy 2030, the GOOS Programmes/projects, and other GOOS initiatives. Identified challenges and opportunities to strengthen collaboration.
09/04/2024	Barcelona, Spain	Conference	Yes	A	GA of the Ocean Decade Program GOOS CoastPredict. Participants: Coastpredict community Presentation on FVON, Fishing Vessel Ocean Observing System and links to EMODnet
09/04/2024	Barcelona, Spain	Conference	Yes	A	Low-cost sensor session at pre-Decade Conference side event Presentation on potential with low-cost sensor technologies and congestion of these data into EMODnet
10-12/04/2024	Barcelona, Spain	Conference	No	A	Ocean Decade Conference 2024
10/04/2024	Riga, Latvia (online)	Workshop	Yes	A	Workshop “Creation of Data Management Plans for Fundamental and Applied Research Projects of the Latvian Science Council and National Research Program projects” Participants: a wide audience covered by scientists from various fields.

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Presentation (in Latvian) includes promotion of EMODnet and SeaDataNet infrastructure.
14-19/04/2024	Vienna		Yes (EMODnet related to ocean acidification)	A	The European Geosciences Union (EGU) GA 2024 Participants: 20,979 registered attendees, of which 18,388 attended in person from 116 countries and 2,591 joined online from 109 countries. Presented EMODnet Chemistry synergies on a global scale to manage ocean acidification data
16, 19/04/2024	Online	External meeting	No	A	EMODnet VDG meeting
19/04/2024	online	Internal meeting	Yes (13)	O	EMODnet Chemistry Steering Committee meeting Participants: 25 members of the EMODnet Chemistry SC Presented and discussed the project state of progress and forthcoming activities
29-30/04/2024	Online	External meeting	Yes	A	EMODnet Steering Committee meeting
02/05/2024	online	External meeting	No	A	MSFD Technical Group on Marine litter internal meeting Participants: MSFD TGML working group and invited experts on marine litter and data management. Setting up seafloor thresholds

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
6-8/05/2024	Copenhagen, Denmark	External meeting	Yes	A	GA of the Baltic Operational Oceanographic System Presentation on new Swedish data flows planned to be ingested to EMODnet
07-08/05/2024	Venice (Italy)	Workshop	Yes (1 presentation)	O	Workshop on the standardisation of ocean acidification data at a global scale Participants: EMODnet Chemistry, NOAA and UNESCO.
14/05/2024	online	External meeting	No	A	Meeting of the MSFD Working Group on data, information and knowledge exchange (WG DIKE) and the Technical group on data (TG Data) Participants: members of the MSFD WG DIKE, members of the TG Data, invited experts on environmental data prioritised by the MSFD. Discussed the MSFD Common Implementation Strategy (CIS) work programme for WG DIKE and TG Data; Adoption of the revised MSFD reference and enumeration lists and timing for next meetings.
14-17/05/2024	Victoria, Canada and online	External meeting	No	A	15th session of The Global Ocean Observing System (GOOS) Observations Coordination Group (GOOS OCG) Updates from the intersessional work and new objectives set, plus new areas discussed for inclusion in the OCG work plan.

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
16/05/2024	Online	Internal meeting	No	O	EMODnet Chemistry monthly meeting on data products Participants: EMODnet Chemistry regional coordinators (AU-DCE, HCMR, IFREMER, IMR, NIMRD, SMHI) AWI, ICES, MARIS, and OGS. Reviewed the progress of the 1st data collection and determine the next steps to fulfil the EEA deadline
16/05/2024	online	External meeting	No	O	EMODnet Chemistry statistics on visualisations and download of data products Participants: OGS and Laseroame IT company Set up the central OGS Graylog system for EMODnet Chemistry with different configuration to receive the log files from each data provider
20-22/05/2024	Valencia (Spain)	External meeting	No	A	MSFD Technical Group on Marine litter internal meeting Participants: MSFD TGML working group and invited experts on marine litter monitoring and data management. Discussed the status of the EMODnet Chemistry proposal to manage seafloor litter data from images and videos and other outcomes and priorities related to ML data management.
21-23/05/ 2024	Lisbon, Portugal	External meeting	Yes	A	EuroGOOS GA

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
22/05/2024	online	External meeting		A	Joint Meeting EMODnet-EDITO alignment Participants: EMODnet Secretariat/TWG/ Coordinators, and DG MARE Shared updates on experience, progress and aligned thinking/strategy to move forward.
23/05/2024	online	Webinar	No	A	DOF2024 Warm Up Webinar Participants: Open to all interested in EDITO platform. Provided the opportunity for Beta-Testers to get acquainted with the EDITO platform, the core, public infrastructure platform of the European Digital Twin Ocean, and to explore its functionalities, ahead of the Digital Ocean Forum (Brussels, 12-13 June 2024).
30/05/2024	online	External meeting	No	O	EMODnet Chemistry statistics on visualisations and download of data products Participants: OGS and Laseroame IT company Set up the central OGS Graylog system for EMODnet Chemistry with different configuration to receive the log files from each data provider
30/05/2024	Svendborg, Denmark	Conference	Yes	A	European Maritime Day Participants: more than 1100 maritime experts and actors Promoted SeaDataNet and EMODnet infrastructure and products at the workshop

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					"Observations to knowledge: Unlocking Ocean Insights", which was well attended with a full room and good audience interaction.
27-29/05/2024	Bergen (Norway)	Conference	Yes (5 presentations and 2 posters)	A	International Conference on Marine Data and Information Systems (IMDIS) 2024 Participants: 190 participants (170 on-site and 20 online) from 28 countries Showcased the latest achievements with general and specific presentations and posters
31/05/2024	online	External meeting	Yes (1 presentation and an online demo)	O	Meeting of the board of experts on the MSFD set up by EMODnet Chemistry Participants: 20 Showcased EMODnet's Chemistry offer for data exploration and extraction
06/06/2024	Online	Webinar	Yes (1 presentation)	A	ONE BLUE project webinar, which was held in conjunction with the European Green Week 2024 Participants: Project partners themselves, environmental authorities and scientists from other European initiatives Showcased EMODnet's long-standing experience in managing data on marine pollutants.
10/06/2024	Online	Internal meeting	No	O	EMODnet Chemistry monthly meeting on data products

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Participants: EMODnet Chemistry regional coordinators (AU-DCE, HCMR, IFREMER, IMR, NIMRD, SMHI) AWI, ICES, MARIS, and OGS. Planning the 2025 edition of the data collections
10/06/2024	Online	Internal meeting	No	O	EMODnet Chemistry SC meeting to discuss the technical proposal for the new call for tenders
11/06/2024	online	External meeting	No	O	EMODnet Chemistry statistics on visualisations and download of data products Participants: OGS and Laseroame IT company Set up the central OGS Graylog system for EMODnet Chemistry with different configuration to receive the log files from each data provider
13/06/2024	Brussels Online	Conference	No	A	Digital Ocean forum 2024 Participants: experts from EMODnet, Copernicus Marine Service, policymakers, European projects, wider stakeholders and interested citizens Featured the prototype of the European Digital Twin of the Ocean (DTO), powered by EMODnet and Copernicus Marine Service via EDITO.
14/06/ 2024	Trieste, Italy	Advanced Master	Yes	A	Advanced Master on Sustainable Blue Economy.

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Participants: postgraduate students from all over the world, especially from the southern Mediterranean countries. Their background ranges from oceanography, marine biology, geology, geophysics, geochemistry, to environmental engineering, ecological modelling, climate studies, coastal zone management, environmental economics and related fields. Chemistry gave a lecture on the role of EMODnet data in providing the knowledge needed to support a sustainable blue economy
19/06/2024	Online	Webinar	No	A	Data for the UN Ocean Decade – A European focus. Participants: an audience with different backgrounds. Participants learnt from EMODnet and other EU data infrastructures/projects about the range of available data and were able to indicate the challenges they face in accessing marine data.
21/06/2024	online	External meeting	No	O	EMODnet Chemistry statistics on visualisations and download of data products Participants: OGS and Laseroame IT company Set up the central OGS Graylog system for EMODnet Chemistry with different

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					configuration to receive the log files from each data provider
24/06/2024	Online	External meeting	No	A	EMODnet Vision Drafting Group meeting #2. Clarity on EMODnet's scope, VDG member input to EMODnet service evolution, Agreement on key EMODnet pillars/components to take forward for the stakeholder consultation, VDG members self-assign to specific EMODnet pillars, timing for VDG Meeting #3.
24/06/2024	Online	External meeting	No	A	MSFD Technical Group on Marine litter internal meeting Participants: MSFD TGML working group and invited experts on marine litter monitoring and data management. Setting up seafloor thresholds
25/06/2024	Online	External meeting	No	A	SeaDataNet AISBL General Assembly 2024 Participants: members of the SeaDataNet AISBL legal entity under the Belgian law ("International non-profit organisation") established since May 6th, 2019.
26/06/2024	Online	Webinar	No	A	Digital Ocean Forum OF 2024 Follow-Up Webinar

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Participants: open to all interest in EDITO platform. Provided an opportunity for participating projects to share feedback on their usage of the EU Digital Twin Ocean Core platform.
03/07/2024	online	External meeting	No	O	EMODnet Chemistry statistics on visualisations and download of data products. Participants: OGS and Laseroame IT company. Set up the central OGS Graylog system for EMODnet Chemistry with different configuration to receive the log files from each data provider
04/07/2024	online	Internal meeting	No	O	Meeting on the EMODnet Chemistry vocabularies. Participants: EMODnet Chemistry WG on vocabulary led by BODC Discuss issues related to data for contaminants
11/07/2024	online	Internal meeting	No	O	Meeting on the EMODnet Chemistry vocabularies. Participants: EMODnet Chemistry WG on vocabulary led by BODC Continue the discuss on the issues related to data for contaminants
11/07/2024	online	External meeting	No	O	EMODnet Chemistry statistics on visualisations and download of data products

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Participants: OGS and Laseroame IT company Set up the central OGS Graylog system for EMODnet Chemistry with different configuration to receive the log files from each data provider
02/09/2024	online	Internal meeting	No	O	EMODnet Chemistry statistics on visualisations and download of data products Participants: OGS and Laseroame IT company Set up the central OGS Graylog system for EMODnet Chemistry with different configuration to receive the log files from each data provider
16/09/2024	Brest	international workshop	Yes	A	IFREMER/SISMER participated in the Ocean and Coastal nutrients workshop held in Brest from 16 to 19 September to present “Nutrients data management: a European approach” and one slide was about EMODnet Chemistry adds-on. Working groups discussed: standards and reagents, raw data process, use of CRMs and harmonisation of metadata reporting.
23-24/09/2024	Copenhagen online	Internal meeting	Yes (19 for the Project Full Group meeting and 3 for the SC meeting)	O	EMODnet Chemistry Project Full Group and SC meetings Participants: whole partnership Take stock of the first year of the continuation of phase 5 in the period from 3 October 2023

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					to 2 October 2024 and plan the necessary medium and long-term measures.
27/09/2024	online	External meeting	No	A	Meeting of the MSFD Technical group on data (TG Data) Participants: members of the TG Data, invited experts on environmental data prioritised by the MSFD. Discussed the MSFD Common Implementation Strategy (CIS) work programme for WG DIKE and TG Data; Adoption of the revised MSFD reference and enumeration lists and timing for next meetings.
27/09/2024	Constanta	Event	No	A	NIMRD participated at the “Night of European Researchers”, a traditional event organised by the Maritime University of Constanța. EMODnet Chemistry was introduced by means of leaflets and videos.
30/09/2024	online	External meeting	No	A	EMODnet Vision Drafting Group meeting #3. Shown the stakeholder responses to the public survey which took place mid July - mid September 2024, and targeted consultations with EMODnet Associated Partners and Sea-basin Checkpoints. The VDG also held interactive discussions to further define key priorities for EMODnet's service evolution

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					according to key pillars spanning EMODnet digital services to EMODnet for Policy.
01/10/2024	Toulouse online	Workshop	Yes (EMODnet Chemistry data and products on eutrophication)	A	Copernicus Marine Workshop dedicated to OSPAR Eutrophication Groups Participants: the OSPAR contracting parties of ICG EUT and EMO and external experts. Demonstration of the reliability of selected Copernicus Marine products for the assessment of eutrophication. The presence of EMODnet Chemistry was useful in the discussion on in situ data. OSPAR Contracting Parties were invited to share their expectations and needs in terms of Copernicus data and ocean knowledge.
02/10/2024	online	Internal meeting	Yes (SMHI showed how the data providers of the Baltic Sea are currently producing the ODV files to submit the integrated data on chlorophyll)	O	EMODnet Chemistry meeting to define a method, agreed with ICES, for data providers to create ODV files when integrated data or both integrated and discrete data are involved. Participants: AWI, BODC, OGS, ICES and the EMODnet Chemistry Regional Coordinators. Set out the procedure to produce the ODV files when dealing with integrated data.
7-9/10/2024	Bruxelles	External meeting	No	A	EMODnet Steering Committee meeting, Technical Working Group meeting and organisation of the Open Sea Lab (OSL) Hackathon

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Participants: EMODnet Secretariat, EMODnet thematic coordinators
08/10/2024	online	Workshop	No	A	International online workshop "AOMI (Atlas of Ocean Microplastics) Database: Enhancing Ocean Microplastics Monitoring. Participants: researchers, institutions, and governments around the world Improve recognition of the Atlas of Ocean Microplastics (AOMI) which was released in May, and to facilitate understanding of the importance of accumulating and utilising monitoring data on marine plastic litter.
09/10/2024	Online	Internal meeting	No	O	Meeting on statistics on data products usage in view of the 15/10/2024 Q32024 report. Participants: OGS and Laseromae (responsible for the development of the system to collect and integrate logs from all EMODnet Chemistry data service providers)
09-11/10/2024	Shanghai	Workshop	Yes	A	International Workshop on Monitoring Assessment, and Prevention of Marine Litter on Seafloor Participants: The EU Joint Research Council, the French Research Institute for the Exploitation of the Sea and 21 other international organisations, research institutes

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					and projects in China, Japan and Europe co-organised and supported the only-invitation event. Discuss the scientific and technical basis for coordinating, standardising and harmonising the monitoring of seafloor litter and the management of the associated data at a global level.
10/10/2024	Naples	Conference	No	A	FAIR-EASE open day on Open Science During the final discussion, the invited European stakeholders (such as EMODnet Chemistry) will provide feedback on the services implemented in the FAIR EASE project Participants: policy makers, institutional authorities, external scientists and other stakeholders. Foster scientific rigour and innovative ideas
10/10/2024	online	Webinar	Yes (How to Access EMODnet Chemistry in situ datasets using Python notebooks by EMODnet Secretariat)	A	Webinar on data for the UN Ocean Decade – A European focus Participants: everyone interested in European initiatives and data from Copernicus, EMODnet and other data sources can contribute to the UN Ocean Decade goals of sustainable use and protection of the ocean. Contribution to the Challenge 1 'Understand and beat marine pollution'

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
14-18/10/2024	Palermo	Congress	Yes (Marine litter data management)	A	CIESM – Mediterranean Science Commission Participants: international scientists Centralised Marine litter DB managed by OGS Participants: hundreds of scientists from countries bordering the Mediterranean. The Commission covers a wide range of marine disciplines thanks to more than 4,000 marine researchers from around 500 research organisations. This expertise is organised in six committees. The member states are: Algeria, Germany, Cyprus, Croatia, Egypt, Spain, France, Greece, Israel, Italy, Lebanon, Malta, Morocco, Monaco, Portugal, Romania, Russia, Slovenia, Switzerland, Syria, Tunisia and Turkey. OGS gave two presentations in the session on the analysis and management of marine data. OGS mentioned EMODnet Biology and EMODnet Chemistry.
18/10/2024	Batumi, Georgia	External Meeting	Yes	O	The third scientific/educational event organized under the auspices of the Ministry of Science and Education of Georgia. Participants: Large number of students, school children, academic personnel and government representatives attended. Several promotional items with the EMODnet Chemistry logo were distributed.

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
22/10/2024	Online	Workshop	No	A	EMODnet Marine Data for Ports, Marinas and Boating Workshop Participants: selected stakeholders from all European sea basins. Explored how the ports, marinas and boating industry can benefit from EMODnet services and fostered engagement in cross-regional dialogue
22/10/2024	online	External meeting	No	A	MSFD Technical Group on Marine litter internal meeting Participants: MSFD TGML working group and invited experts on marine litter monitoring and data management. Updating the Joint List of Litter Categories
23/10/2024	Oslo, online	External workshop/training	Yes (EMODnet Chemistry data management)	A	Workshop organized in the framework of the Horizon "Zero pollution" project CONTRAST. A presentation on EMODnet management of data on marine pollution was requested.
23-25/10/2024	Constanta, Romania	Conference	Yes (Poster)	A	MARBLUE 2 International Conference Presented the best practices developed within the Pan-European Initiatives SeaDataCloud and EMODnet on the use of marine data and metadata standardisation

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
24/10/2024	online	Internal meeting	No	O	EMODnet Chemistry monthly meeting on data products + meeting of the working group on QC procedures Participants: OGS, EMODnet Chemistry Regional Coordinators, AWI, ICES Discussed the 2nd release of data collections on eutrophication and contaminants expected for the continuation of phase 5 (i.e. 3 October 2023 to 2 October 2025) and how to update the QC procedures.
31/10/2024	online	Internal meeting	No	O	Meeting on statistics on data products usage Participants: OGS, AWI, Laseromae, IFREMER, HCMR, ULiege Taken action to integrate statistics from AWI and discussed how to obtain n. of visualisations from IFREMER.
29/10 - 1/11/2024	Vienna, online	External meeting	Yes (marine litter data management)	A	Meeting of the IAEA's NUTEC Plastics project Participants: stakeholders from 86 countries participating in marine monitoring of microplastics under the IAEA's NUTEC Plastics initiative How to build up a database for Member States of the International Atomic Energy Agency
31/10/2024	online	Internal meeting	No	O	EDITO-Infra phase 2: input by EMODnet Chemistry Participants: EMODnet Chemistry SC

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
08/11/2024	Lisbon	External meeting	Yes (EMODnet overview + insight into Chemistry and its NODC in Portugal, EMODnet Ingestion, EMODnet Physics, EMODnet Bathymetry)	O	Meeting on data pathways from Portuguese major river mouths Participants and details Establish the pathway to make data on nutrients near the major estuaries of Portugal accessible via EMODnet Chemistry
13/11/2024	Online	External meeting	No	A	Meeting of the Global Partnership on Marine Litter (GPML) on Data Harmoniation Participants: the GPML is a multi-stakeholder partnership led by the United Nations Environment Programme which brings together all the actors working on marine litter and plastic pollution prevention and reduction.
14/11/2024	Brussels	External meeting	Yes	O	A meeting to introduce to the RBINS marine modeller group the landscape of marine data infrastructures (incl. EMODnet). Participants: 20 participants
14/11/2024	Online	Internal meeting	No	O	EMODnet Chemistry QC group Participants: OGS, EMODnet Chemistry regional coordinators Improve quality control procedures for data of contaminants and eutrophication
15/11/2024	online	Internal meeting	No	O	Meeting on statistics on data products usage Participants: OGS, Laseromae, AWI

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Integrate the logs from EMODnet Chemistry webODV data explorer and extractor service into the Graylog system implemented for the project.
18/11/2024	online	Internal meeting	No	O	Meeting on statistics on data products usage Participants: OGS, Laseromae Integrate the logs from EMODnet Chemistry webODV data explorer and extractor service into the Graylog system implemented for the project.
22/11/2024	online	Internal meeting	No	O	Meeting on statistics on data products usage Participants: OGS, Laseromae Integrate the logs from EMODnet Chemistry webODV data explorer and extractor service into the Graylog system implemented for the project.
25/11/2024	Online	External meeting	No	A	MSFD Technical Group on Marine litter internal meeting Participants: MSFD TGML working group and invited experts on marine litter monitoring and data management. Updating the Joint List of Litter Categories

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
26/11/2024	online	Internal meeting	No	O	EMODnet Chemistry monthly meeting on data products Participants: OGS, EMODnet Chemistry RCs, AWI, ICES Checked the progress of the data collections for eutrophication and pollutants that will be published in May 2025
27/11/2024	online	External meeting	No	A	EMODnet Vision Drafting Group meeting
28/11/2024	online	External meeting		A	MSFD Technical Group on Marine litter internal meeting Participants: MSFD TGML working group and invited experts on marine litter monitoring and data management. Discussed marine microlitter QA/QC
02/12/2024	online	Internal meeting	No	O	Meeting on statistics on data products usage Participants: OGS, Laseromae Integrate the logs from EMODnet Chemistry webODV data explorer and extractor service into the Graylog system implemented for the project. Refine log flow from IFREMER.
06/12/2024	online	Internal meeting	No	O	EMODnet Chemistry QC group Participants: OGS, EMODnet Chemistry regional coordinators

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Improve quality control procedures for data of contaminants and eutrophication
09/12/2024	online	Internal meeting	No	O	Meeting on statistics on data products usage Participants: OGS, Laseromae Integrate the logs from EMODnet Chemistry webODV data explorer and extractor service into the Graylog system implemented for the project. Refine log flow from IFREMER.
12/12/2024	online	External meeting	No	A	MSFD Technical Group on Marine litter internal meeting Participants: MSFD TGML working group and invited experts on marine litter monitoring and data management. 23 rd meeting of the Technical Group on Marine Litter (TG ML)
16/12/2024	online	Internal meeting	No	O	Meeting on statistics on data products usage Participants: OGS, Laseromae Validate statistics for the Q42024report
17/12/2024	online	External meeting	No	A	MSFD Technical Group on Marine litter internal meeting Participants: MSFD TGML working group and invited experts on marine litter monitoring and data management.

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Updating the Joint List of Litter Categories
20/12/2024	online	Internal meeting	No	O	Meeting on statistics on data products usage Participants: OGS, Laseromae Validate statistics for the Q42024report
08/01/2025	online	Internal meeting	No	O	EMODnet Chemistry statistics on visualisations and download of data products Participants: OGS and Laseroame IT company Checked log requests for the reporting period Q42024
10/01/2025	online	Internal meeting	No	O	EMODnet Chemistry monthly meeting on data products Participants: EMODnet Chemistry regional coordinators (AU-DCE, HCMR, IFREMER, IMR, NIMRD, SMHI) AWI, ICES, MARIS, and OGS. Reviewed the progress of the 2nd data collections of phase 5 – renewal (2023-2025) and determined the next steps to fulfil the EEA deadline
24/01/2025	online	External meeting	No	A	TGML meeting on seafloor litter data Participants: MSFD TGML working group and invited experts on marine litter monitoring and data management.
28/01/2025	online	External meeting	No	A	Meeting of the MSFD Technical group on data (TG Data)

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Participants: members of the TG Data, invited experts on environmental data prioritised by the MSFD.
29/01/2025	online	Internal meeting	No	O	Vocab issues for EMODnet Chemistry Participants: EMODnet Chemistry WG on vocabulary led by BODC Discuss issues related to data for contaminants and AOB
04/02/2025	online	External meeting	Yes (EMODnet Chemistry general info + new data products on marine litter)	O	Meeting of the board of experts on the MSFD set up by EMODnet Chemistry Participants: 20 Showcased and discussed the new EMODnet's Chemistry data products on contaminants
06/02/2025	online	Internal meeting	No	O	EMODnet Chemistry monthly meeting on data products Participants: EMODnet Chemistry regional coordinators (AU-DCE, HCMR, IFREMER, IMR, NIMRD, SMHI) AWI, ICES, MARIS, and OGS. Reviewed the progress of the 2nd data collections of phase 5 – renewal (2023-2025) and determined the next steps to fulfil the EEA deadline
25/02/2025	online	Internal meeting	No	O	EMODnet Chemistry monthly meeting on data products

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Participants: EMODnet Chemistry regional coordinators (AU-DCE, HCMR, IFREMER, IMR, NIMRD, SMHI) AWI, ICES, MARIS, and OGS. Reviewed the progress of the 2nd data collections of phase 5 – renewal (2023-2025) and determined the next steps to fulfil the EEA deadline
27/02/2025	online	Internal meeting	No	O	Vocab issues for EMODnet Chemistry Participants: EMODnet Chemistry WG on vocabulary led by BODC Discuss issues related to data for contaminants and AOB
28/02/2025	online	Internal meeting	No	O	TGML meeting on seafloor litter data Participants: MSFD TGML working group and invited experts on marine litter monitoring and data management.
03-07/03/2025	Brussels, Belgium	Conference	Yes	A	European Ocean Days 2025 Participants: Stakeholders from across Europe's Ocean community EMODnet Chemistry was presented as an important EU asset for marine knowledge at the session "Marine Knowledge for the Ocean Pact", by the EMODnet Chemistry Coordinator OGS.

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
05/03/2025	online	External meeting	No	A	International Expert Meeting on Marine Plastic Litter Monitoring Data Sharing Project, MOEJ Participants: members of the specific group of experts brought together by the Marine Plastic Litter Monitoring Data Sharing Project of the Ministry of the Environment, Japan.
05/03/2025	online	Internal meeting	No	O	Vocab issues for EMODnet Chemistry Participants: EMODnet Chemistry WG on vocabulary led by BODC Discuss issues related to data for contaminants and AOB
10-11/03/2025	Santa Marta, Colombia	Conference	Yes (Poster on EMODnet Chemistry and SeaDataNet synergies)	A	3rd International Ocean Data Conference (IODC-3) Participants: 400 participants worldwide, 150 in-person and 250 online. The conference underscored the importance of strengthening data infrastructure, improving accessibility, and fostering collaboration to ensure inclusive and equitable participation in the global digital ocean ecosystem.
11-13/03/2025	Monaco	External meeting	No	A	GPML_CoP_meeting_on_Plastic_Pollution_Monitoring_Harmonization Participants: the GPML is a multi-stakeholder partnership led by the United Nations Environment Programme which brings

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					together all the actors working on marine litter and plastic pollution prevention and reduction. The workshop key objectives: Identify KPIs across the plastic life cycle; Identify key terminologies and definitions to create a glossary; Explore options for data integration and expansion of the Digital Platform Data Hub for global and national monitoring and assessment.
12-14/03/2025	online	External meeting	No	A	28th Session of the IODE Committee (IODE-28) Participants: 186 (attendance by invitation) Defined the IODE-28 Action Paper
18/03/2025	online	External meeting	Yes (EMODnet Chemistry support for the MSFD implementation)	A	Meeting of the MSFD Technical group on data (TG Data) Participants: members of the TG Data, invited experts on environmental data prioritised by the MSFD.
18/03/2025	online	Internal meeting	No	O	Vocab issues for EMODnet Chemistry Participants: EMODnet Chemistry WG on vocabulary led by BODC Discussed issues related to data for marine litter and AOB
18-20/03/2025	Brest, France	Workshop	Yes (Evaluation of EMODnet Chemistry eutrophication data and relation to Etna eruptions)	A	FAIR-EASE Hackathon Participants; 28

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Analysis of multidisciplinary datasets to detect impact of volcanic ash deposition on marine productivity and carbon budget
21/03/2025	online	Internal meeting	Yes (15 presentations focussing on specific WPs and technical issues)	O	EMODnet Chemistry SC+TWG meeting Participants: 23 members of the EMODnet Chemistry SC and TWG Illustrated project progress per WP and agreed actions to solve problems and promote further developments.
24-28/03/2025	online	Workshop	No	A	EMODnet OSL 4.0 Hackathon Participants: data scientists, software developers, social innovators, and changemakers from across Europe Used EMODnet's in situ marine data and Copernicus Marine Service data on the European Digital Twin Ocean (EDITO) platform to develop innovative solutions supporting the EU Green Deal, the EU Mission (Restore Our Ocean and Waters) and the UN Sustainable Development Goals (SDGs).
24/03/2025	online	External meeting	Yes (EMODnet Chemistry general info + new data products on marine litter)	A	Meeting of the board of experts on the MSFD set up by EMODnet Chemistry Participants: 20 Showcased and discussed the new EMODnet's Chemistry data products on marine litter

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
31/03/2025	online	Internal meeting	No	O	EMODnet Chemistry vocabulary Participants: EMODnet Chemistry working group on vocabulary Changes needed in the P36 vocabulary
1-3/04/2025	online	External meeting	Yes	A	EMODnet Ingestion - Plenary Meeting Participants: EMODnet Ingestion partnership Discussed progress with Ingestion and safe-keeping of marine data also at national level.
04/04/2025	online	External meeting	No	O	EMODnet Chemistry statistics on visualisations and download of data products Participants: OGS and Laseroame IT company Checked log requests for the reporting period Q12025
08/04/2025	Genoa, Italy	Conference	Yes (The importance of NODCs and EMODnet Chemistry in the marine knowledge value chain)	O	"FAIR Assessments for Research Quality Evaluation and Reproducibility", the Italian appointment of the FAIR National Roadshow organized by FAIR-IMPACT project. Participants: 30 in-person, 54 online Explored the current framework of open science policy in Italy. Showcased FAIR best practices within Italian scientific communities, particularly in the management of environmental emergencies and in ocean and marine science applications.

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
10/04/2025	online	Internal meeting	No	O	EMODnet Chemistry monthly meeting on data products Participants: EMODnet Chemistry regional coordinators (AU-DCE, HCMR, IFREMER, IMR, NIMRD, SMHI) AWI, ICES, MARIS, and OGS. Reviewed the progress of the 2nd data collections of phase 5 – renewal (2023-2025) and determined the next steps to fulfil the EEA deadline
27/04– 02/05/ 2025	Vienna, Austria	External meeting	Yes (Presentation on use case for EMODnet Chemistry + 2 slide on EMODnet within the SeaDataNet presentation at the ENVRI Community booth)	A	EGU GA 2025 Participants: The assembly is open to the scientists of all nations The sessions of the EGU General Assembly 2025 programme are distributed amongst disciplinary, inter- and transdisciplinary, union-wide, and community-led programme groups (PGs)
05/05/2025	online	Internal meeting	No	O	EMODnet Chemistry vocabulary Participants: OGS members of the EMODnet Chemistry working group on vocabulary Discussed the P35 preferred labels and definitions
06/05/2025	online	Internal meeting	No	O	EMODnet Chemistry monthly meeting on data products

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Participants: EMODnet Chemistry regional coordinators (AU-DCE, HCMR, IFREMER, IMR, NIMRD, SMHI) AWI, ICES, MARIS, and OGS. Reviewed the progress of the 2nd data collections of phase 5 – renewal (2023-2025) and determined the next steps to fulfil the EEA deadline
7-8/05/2025	online	External meeting	No	A	EMODnet SC meeting
22-23/05/2025	Brussels, Belgium	External meeting	No	A	MSFD Technical Group on Marine litter internal meeting Participants: MSFD TGML working group and invited experts on marine litter monitoring and data management.
26/05/2025	online	Internal meeting	No	O	EMODnet Chemistry monthly meeting on data products Participants: EMODnet Chemistry regional coordinators (AU-DCE, HCMR, IFREMER, IMR, NIMRD, SMHI) AWI, ICES, MARIS, and OGS. Reviewed the progress of the 2nd data collections of phase 5 – renewal (2023-2025)
4-6/06/2025	Nice, France	Conference	Yes	A	One Ocean Science Congress
09/06/2025	online	Internal meeting	No	O	EMODnet Chemistry vocabulary Participants: OGS members of the EMODnet Chemistry working group on vocabulary

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					Discussed the P35 preferred labels and definitions
9-13/06/2025	Nice, France	Conference	Yes (1. Presentation =>EMODnet: the European system in connection with Global systems; 2. Presentation => EMODnet as the EU data platform for marine litter data; 3. Poster => EMODnet: An EU data service providing FAIR, integrated marine data for the global ocean data ecosystem	A	2025 UN Ocean Conference
16-18/06/2025	Milazzo	Conference	Yes (Semantic interoperability in marine litter of EMODnet Chemistry)	A	XIX Conference of the Geosciences and Information technologies session of the Italian geological society Participants: international scientific community Presented standards and semantics adopted by EMODnet Chemistry to make data reusable and interoperable.
23/06/2025	online	Internal meeting	No	O	EMODnet Chemistry vocabulary Participants: OGS members of the EMODnet Chemistry working group on vocabulary Illustrated and approved changes made to the P35 alternative labels as discussed in previous

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
					meetings of the vocabulary WG and in the monthly meetings on data products
25/06/2025	online	Internal meeting		O	EMODnet Chemistry monthly meeting on data products Participants: EMODnet Chemistry regional coordinators (AU-DCE, HCMR, IFREMER, IMR, NIMRD, SMHI) AWI, ICES, MARIS, and OGS. Finalisation of the 2nd data collections of phase 5 – renewal (2023-2025)
07/08/2025	online	Internal meeting	Yes (Options to solve current issues with P36 and P02)	O	EMODnet Chemistry vocabulary Participants: OGs and BODC Found the solution to the issues with P36 and P02 vocabularies
15/09/2025	online	Internal meeting	No	O	EMODnet Chemistry monthly meeting on data products Participants: EMODnet Chemistry regional coordinators (AU-DCE, HCMR, IFREMER, IMR, NIMRD, SMHI) AWI, ICES, MARIS, and OGS. Climatologies and the related meeting with the board of experts on the MSFD
22/09/2025	online	Internal meeting	No	O	EMODnet Chemistry last SC meeting of phase 5 (2023-2025) Participants: EMODnet Chemistry partners and subcontractors

A. Meetings/events organised and attended in this project phase					
Date	Location	Type event (internal or external meeting; training/ workshop)	Was a presentation given? (yes/no + short description)	Meeting attended (A) / organised (O)	Short description and main results (# participants, agreements made, etc.)
26/09/2025	Trieste (Italy) and online	Conference	Yes (EMODnet Chemistry data on marine litter for EU policy)	O	The event "Environmental crisis: data requires a change of direction" organised by the NODC as part of Trieste Next 2025. Participants (in-person): 60 The event aimed to highlight scientific data demonstrating the urgent need to address the environmental emergencies affecting the planet responsibly.
26/09/2025	Trieste (Italy) and online	Master	Yes ("From "good" data …. To good decisions From data to knowledge for sustainable blue economy")	A	Lecture at the Blue Economy Advanced Master co-organized by OGS and the University of Trieste
29/09/2025	online	Internal meeting	Yes (1. EMODnet overview 2.Eutrophication and acidity data collections 3. Climatologies)	O	Meeting of the board of experts on the MSFD set up by EMODnet Chemistry Participants: 20 Showcased and discussed the new EMODnet's Chemistry data products on eutrophication
SUM				**O**	**Total # of meetings organised = 74**
SUM				**A**	**Total # of meetings attended = 103**

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
13-16/10/2025	Brisbane (Australia)	Conference	A	SciDataCon within the International Data Week.
14/10/2025	Online	External meeting	A	EMODnet TWG
23/11/2025	Online	Webinar	A	Official launch of the EMODnet Vision 2035 Participants: Representatives who have been instrumental in developing the vision, members of the EMODnet network, other significant participants from across the EMODnet value chain and related marine data landscapes and external stakeholders, i.e. experts and organizations that rely on and contribute to marine data services.
24/11/2025	Brussels	Internal meeting	O	KO meeting to present the EMODnet Chemistry new phase to the partnership
25-27/11/2025	Brussels	External meeting	A	EMODnet Jamboree+Open Conference+Digital Ocean Forum

8 Communication assets

A. Communication products developed				
Date	Communication material	Short description (of the material, title, …) of the asset	Main results	Name of event at which material was disseminated (if applicable)
10/2023	EMODnet newsletter and web news	New marine litter data collections now accessible via the EMODnet Products Catalogue	Increase visibility of the latest EMODnet Chemistry cooperation	
10/2023	EMODnet newsletter and web news	EMODnet Chemistry at EUROqCHARM final conference	Show the involvement of EMODnet Chemistry in the management of marine litter data	
10/2023	EMODnet newsletter and webnews	EMODnet showcases European marine data service best practices at OBPS VII 2023	Increase the visibility of the new contaminant products at the EMODnet Open Conference.	
11/10/2023	OGS-NODC twitter post	We are at the @EUROqCHARM final conference!	Keep the dialogue with our followers alive and inform them about our projects	
12/10/2023	OGS-NODC web news (IT and EN)	Marine litter: EUROqCHARM final conference	Show the involvement of EMODnet Chemistry in the management of marine litter data	
13/10/2023	OGS-NODC twitter post	Watch the video where Megan Ann French from NODC talks about Chemistry at the UN Ocean Best practices System workshop VII	Increase visibility of data products	
13/10/2023	OGS-NODC twitter post	Here we are! Alessandra Giorgetti and Matteo Vinci from NODC at @OGS_IT) with François Galgani from IFREMER and Bert van Bavel from NIVA, coordinating the @EUROqCHARM project. Work in progress at the @EUROqCHARM final conference	Increase visibility of data products	
13/10/2023	OGS-NODC web news (IT and EN)	UN Ocean Best Practices System: Workshop 2023	Illustrate the new QC questionnaire	

A. Communication products developed				
Date	Communication material	Short description (of the material, title, …) of the asset	Main results	Name of event at which material was disseminated (if applicable)
06/11/2023	OGS-NODC twitter post	On 4-5 November NODC was at the Genoa Science Festival. NODC and ETT SpA had the talk 'When Science gives numbers' and the lab dedicated to the board game 'Impatto' (Impact) to raise awareness of the importance of reliable data for the UN 2030 Agenda.	Keep the dialogue with our followers alive and inform them about our projects	
06/11/2023	OGS-NODC web news (IT and EN)	Learning by playing at the Genoa Science Festival	Raise awareness of the importance of high-quality data management and increase the visibility of EMODnet Chemistry Best Practises	
29-30/11/2023	Poster	Poster entitled "Marine Litter Database and associated products"	Showcase EMODnet Chemistry and its latest outcomes	EMODnet Conference 2023 virtual exhibition
29-30/11/2023	Poster	Poster on contaminants maps	Showcase EMODnet Chemistry and its latest outcomes at the EMODnet Open Conference.	EMODnet Conference 2023 virtual exhibition
29-30/11/2023	Poster	Poster on EMODnet webODV data explorer and extractor tool	Increase visibility of the latest EMODnet Chemistry best practices	EMODnet Conference 2023 virtual exhibition
29-30/11/2023	Virtual Exhibition wall	General presentation of EMODnet Chemistry activities, products, services and main achievements	Increase visibility of the latest EMODnet Chemistry co-operations	EMODnet Conference 2023 virtual exhibition
29-30/11/2023	Presentations	Different thematic presentations for different sessions of the EMODnet Open Conference	Increase visibility of EMODnet activities	EMODnet Conference 2023
December 2023	EMODnet newsletter and webnews	EMODnet Chemistry start a new phase and present future plans presented at the EMODnet Jamboree and Open Conference 2023	Illustrate the most important goals for the next two years	
December 2023	EMODnet newsletter and webnews	EMODnet Chemistry: New marine litter maps online	Promote new data products	
20/12/2023	OGS-NODC web news (IT and EN)	Marine litter data: the new guidelines online	Inform on the new steps taken to tackle marine litter pollution	

A. Communication products developed				
Date	Communication material	Short description (of the material, title, …) of the asset	Main results	Name of event at which material was disseminated (if applicable)
20/12/2023	OGS-NODC twitter post	That's great!! A new mainstay to tackle marine litter pollution! Read the article of the EC Joint Research Centre on the recently released Guidance on Monitoring Marine Litter in European Seas	Increase visibility of the latest best practices for marine litter involving EMODnet Chemistry	
14/12/2023	Cedre newsletter	Article dedicated to the EMODnet Jamboree and Open Conference	spread the results of the Conference in the monthly updated newsletter presenting Cedre's key events.	
26/01/2024	EMODnet newsletter and webnews	The EMODnet Chemistry 2023 Top 5 for a good start to the new year!	Disseminate the best results of 2023	
29/01/2024	EMODnet newsletter and webnews	New maps for contaminants with EMODnet Chemistry	Promote the new maps	
02/02/2024	OGS-NODC web news (IT and EN)	Trieste hosted the latest EMODnet Chemistry Training course	spread the news of EMODnet Chemistry training course (January 2024)	
02/02/2024	OGS-NODC twitter post	A big thank you to all participants of the EMODnet Chemistry Training Course 2024.	spread the news of EMODnet Chemistry training course (January 2024) 85 visualisations 11 interactions	
27/02/2024	EMODnet newsletter and webnews	Pollutant concentration: a guided tour to EMODnet Chemistry maps in the Map Viewer	Promote the understanding and use of the EMODnet Map Viewer	
11/03/2024	new EMODnet ingestion video	provided text and images related to marine litter data via EMODnet Ingestion	Increase visibility of EMODnet Chemistry use cases	
14/03/2024	IFREMER web news (data.ifremer.fr)	EMODnet Chemistry training course on January 2024	Spread the news of EMODnet Chemistry training course (January 2024) through IFREMER news webpage	
14/03/2024	EMODnet webnews	The latest EMODnet Chemistry Training Course held in Trieste, Italy	spread the news of EMODnet Chemistry training course (January 2024)	
08/04/2024	EMODnet web use cases	Eutrophication climatology to decipher the consequences of	Increase visibility of EMODnet Chemistry use cases	

A. Communication products developed				
Date	Communication material	Short description (of the material, title, …) of the asset	Main results	Name of event at which material was disseminated (if applicable)
		climate change in the Adriatic Sea		
23/04/2024	EMODnet webnews	Data quality: EMODnet Chemistry Coordinator OGS becomes a UNESCO-accredited data centre	Raising awareness of the importance of quality services and how most EMODnet Chemistry NODCs achieve this goal through the IODE accreditation scheme	
08/05/2024	EMODnet web use cases	EMODnet Marine litter data used to develop and test the first Marine Litter Assessment Tool	Increase visibility of EMODnet Chemistry use cases	
24/05/2024	EMODnet web use cases	A simple dashboard for visualising trends in oxygen and nitrate concentrations	Increase visibility of EMODnet Chemistry use cases	
May 2024	EMODnet report	EMODnet annual report	Inform on the achievements of the past year	
31/05/2024	EMODnet newsletter and webnews	Ocean acidification (OA): EMODnet experts join workshop with NOAA and UNESCO on OA global data management	spread the word about the new interactions on a global level	
26/06/2024	EMODnet newsletter and webnews	EMODnet Chemistry experts present at ONE BLUE project webinar	Promote EMODnet Chemistry participation in scientific events	
26/06/2024	EMODnet webnews	Webinar showcasing EMODnet's Chemistry offer for data exploration and extraction	Promote EMODnet Chemistry data, products and services	
26/06/2024	EMODnet web use cases	EMODnet Chemistry contribution to IMDIS 2024	Promote EMODnet Chemistry participation in scientific events	
26/06/2024	EMODnet web use cases	EMODnet Data in Action: Beach Litter Monitoring App and Venice Lagoon Plastic Free	Increase visibility of EMODnet Chemistry use cases	
July 2024	EMODnet Chemistry static content on EMODnet Portal	Overall revision and update of the EMODnet static content concerning Chemistry: https://emodnet.ec.europa.eu/en/chemistry https://emodnet.ec.europa.eu/en/marine-litter Partnership Products Catalogue MoU	Make it easier for our various stakeholders to find EMODnet Chemistry information on data, products and services.	

A. Communication products developed				
Date	Communication material	Short description (of the material, title, …) of the asset	Main results	Name of event at which material was disseminated (if applicable)
		Reports Guidelines (Guidelines to include complete metadata in the CDIs for EMODnet Chemistry data)		
July/August 2024	Cedre web news (CEDRE website https://wwz.cedre.fr/en)	Transmission of marine litter monitoring data to EMODnet	Increase the visibility of EMODnet Chemistry and the EMODnet portal to Cedre's partners	
27/08/2024	EMODnet newsletter and webnews	EMODnet Chemistry welcomes a new partner	Celebrate new partners and introduce them to our users	
17/09/2024	EMODnet web use cases	Harmonised, standardised and validated data collections on eutrophication and chemical pollution for the EU Marine Strategy Framework Directive	Increase visibility of EMODnet Chemistry use cases	
25/09/2024	Chiara Altobelli post on LinkedIn	Back from Copenhagen ! There we (The National Oceanographic Data Centre at OGS) held the two-day annual meeting of the EMODnet Chemistry project. Representatives from all over Europe and neighbouring countries were welcomed by the International Council for the Exploration of the Sea (ICES), a strategic partner of the project since its launch in 2009.	Make the EMODnet Chemistry consortium and the great work being done together visible	
10/2024	Cedre's website	Article presenting EMODnet Chemistry project and Cedre's contribution on its website.	Illustrate EMODnet Chemistry project and Cedre's contribution	
07/10/2024	Cedre's newsletter	Article of the monthly updated newsletter presenting Cedre's key events about its contribution to EMODnet Chemistry database, more especially beach litter data.	Highlight the EMODnet project for Cedre's partners and subscribers of the newsletter.	
01/10/2024	EMODnet newsletter and webnews	The first European validated data collection on eutrophication and acidity is online	Promote EMODnet Chemistry data, products and services	
09/10/ 2024	ICES post on LinkedIn	Even the most expensive networks achieve the greatest	Make the EMODnet Chemistry consortium and	

A. Communication products developed				
Date	Communication material	Short description (of the material, title, …) of the asset	Main results	Name of event at which material was disseminated (if applicable)
		impact when collaborating with other networks. By pooling diverse data sets and leveraging each network's unique expertise, we can unlock even greater insights and opportunities	the great work being done together visible	
09/10/2024	Chiara Altobelli post on LinkedIn	EMODnet (the European Marine Observation and Data Network) will be among the stakeholders participating in the final discussion of the event. I am also EMODnet, so I strongly recommend you to register!	Promote EMODnet Chemistry activity for Open Science	
14/10/2024	OGS-NODC X post	We were at the workshop "AOMI Database: Enhancing Ocean Microplastics Monitoring" to present the @EMODnet marine litter data management!	Promote EMODnet Chemistry collaborations on a global scale	
14/10/2024	OGS-NODC web news (IT and EN)	AOMI: the Atlas of Ocean Microplastics	Promote EMODnet Chemistry collaborations on a global scale	
14/10/2024	Chiara Altobelli post on LinkedIn	We were at the workshop "AOMI Database: Enhancing Ocean Microplastics Monitoring" to present the EMODnet marine litter data management! The workshop took place online on 8 October and was organised by the Ministry of the Environment, Japan (MOEJ) to show the Atlas of Ocean Microplastics (AOMI).	Promote EMODnet Chemistry collaborations on a global scale	
22/10/2024	Chiara Altobelli post on LinkedIn	We of the National Oceanographic Data Centre at OGS were recently in Shanghai (China) to represent EMODnet at the International Workshop on Monitoring, Assessment and Prevention of Marine Litter on the seafloor.	Promote EMODnet Chemistry collaborations on a global scale	

A. Communication products developed				
Date	Communication material	Short description (of the material, title, …) of the asset	Main results	Name of event at which material was disseminated (if applicable)
22/10/2024	OGS-NODC X post	Glad to be invited and have recently attended the 'International Workshop on Monitoring, Assessment and Prevention of Marine Litter on the seafloor' to represent @EMODnet	Promote EMODnet Chemistry collaborations on a global scale	
22/10/2024	OGS-NODC web news (IT and EN)	Marine litter on the seafloor: the NODC at the workshop in China	Promote EMODnet Chemistry collaborations on a global scale	
29/10/2024	EMODnet web news item/newsletter	Open source software: key applications in EMODnet Chemistry and beyond	Show the EMODnet Chemistry contribution to Open Science	
29/10/2024	EMODnet web news item/newsletter	News on the EMODnet Chemistry PFG and SC meeting in Copenhagen	Make visible our partnership and the work together with ICES	
29/10/2024	EMODnet web news item/newsletter	International Expert Meeting on Marine Plastic Litter Monitoring Data Sharing Project, MOEJ	Raising awareness of EMODnet Chemistry's commitment at a global level	
29/10/2024	EMODnet web news item/newsletter	Workshop on microplastics confirms the cooperation of EMODnet Chemistry with Japan's Ministry of the Environment	Raising awareness of EMODnet Chemistry's commitment at a global level	
31/10/2024	EMODnet web news item/newsletter	EU Ocean Data Series Webinar Highlighted Solutions for a Clean, Resilient Ocean	Promote EMODnet Chemistry data, products and services	
28/11/2024	EMODnet web news item/newsletter	EMODnet Chemistry and Blue Cloud 2026 project: a win-win interaction	Providing information about synergies with other projects aimed at implementing the principles of Open Science	
28/11/2024	EMODnet web news item/newsletter	Data from major river mouths: Portugal shows leadership for expanding the EMODnet offer	Showing EMODnet Chemistry's efforts to streamline data accessibility at the national level	
10/01/2025	Chiara Altobelli post on LinkedIn	Have your say! Take part in the call for evidence for the Pact for the Oceans that the	Get EMODnet users and followers involved in the call for evidence for the Pact for the Oceans	

A. Communication products developed				
Date	Communication material	Short description (of the material, title, …) of the asset	Main results	Name of event at which material was disseminated (if applicable)
		European Commission, DG MARE, has just published. (..)		
10/01/2025	Chiara Altobelli post on LinkedIn	Done! I have submitted an abstract for the EGU GA 2025 to inform about use cases for EMODnet Chemistry. Wish me luck that the presentation will be approved!	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
17/01/2025	EMODnet web use case/newsletter	"An integrative tool for the assessment of eutrophication status at the sub-basin level in the Mediterranean region"	Showing different uses of EMODnet Chemistry	
20/01/2025	Chiara Altobelli post on LinkedIn	(..) the OGS is pleased to forward you this invitation to participate in the EMODnet Open Sea Lab.	Get EMODnet users and followers involved in its activity	
31/01/2025	EMODnet web news item/newsletter	The EMODnet Chemistry 2024 Top 5: A look back to plan ahead	Recall and celebrate 2024 achievements	
04/02/2025	EMODnet web page (reports)	Chemistry: 5.2 Report on the meeting with the MSFD board of experts on contaminants	Increase visibility of the Board of experts on the MSFD	
05/02/2025	Chiara Altobelli post on LinkedIn	As part of the National Oceanographic Data Centre at OGS, the coordinator of EMODnet Chemistry project, I am proud to share with you the EMODnet Chemistry 2024 Top 5: A look back to plan ahead	Recall and celebrate 2024 achievements	
12/02/2025	OGS web news (IT and EN)	Decline of marine litter on the European coasts	Showing different uses of EMODnet Chemistry	
14/02/2025	OGS-NODC web news (IT and EN)	Marine litter: Encouraging news from the European Commission	Showing different uses of EMODnet Chemistry	
14/02/2025	OGS-NODC X post	Marine litter on the EU coastline is down by 29% as reported in 'European Coastline Macro Litter Trends 2015 - 2021' (..)	Showing different uses of EMODnet Chemistry	

A. Communication products developed				
Date	Communication material	Short description (of the material, title, …) of the asset	Main results	Name of event at which material was disseminated (if applicable)
		The NODC contributed to this document and has been fighting marine litter thanks to @EMODnet!		
19/02/2025	EMODnet web page	A new section on the side menu Board of expert on the MSFD	Increase visibility of the Board of experts on the MSFD	
28/02/2025	Chiara Altobelli post on LinkedIn	Read the EMODnet Chemistry use case titled "An integrative tool for the assessment of eutrophication status at the sub-basin level in the Mediterranean region" (..)	Showing different uses of EMODnet Chemistry	
28/02/2025	EMODnet web news item/newsletter	Contaminant data and maps: How to make the most of the Map viewer	Showing EMODnet Chemistry services	
28/02/2025	EMODnet web news item/newsletter	Pollutant maps: Consultation of EMODnet Chemistry board of experts on the Marine Strategy Framework Directive (MSFD)	Make EMODnet users and followers aware of EMODnet Chemistry's efforts to fine-tune data products in collaboration with MSFD experts	
28/02/2025	Chiara Altobelli post on LinkedIn	Marine litter on the EU coastline is down by 29%!! This is according to the report 'European Coastline Macro Litter Trends 2015 - 2021', (..) We the National Oceanographic Data Centre at OGS (..) have been fighting marine litter thanks to EMODnet: the European Marine Observation and Data Network	Showing different uses of EMODnet Chemistry	
07/03/2025	OGS post on LinkedIn	Dal 3 al 7 marzo si sono tenuti a Bruxelles gli “European Ocean Days”, (..)	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
07/03/2025	OGS-NODC X post	Alessandra Giorgetti, (..), ha ha appresentato la comunità scientifica nazionale che si occupa di dati marini oggi agli	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	

A. Communication products developed				
Date	Communication material	Short description (of the material, title, …) of the asset	Main results	Name of event at which material was disseminated (if applicable)
		European Ocean Days di Bruxelles (..)		
11/03/2025	OGS-NODC X post	More from Ocean Data Conference in Colombia	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
11/03/2025	OGS-NODC X post	We are at the International Ocean Data Conference in Colombia. This scientific event has been taking place since yesterday and is followed by the session of the Intergovernmental Oceanographic Committee for Data and Information Exchange (IODE)	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
13/03/2025	OGS-NODC X post	Since 10 March we have been in Santa Marta, Colombia, for two unmissable events: the (..) (IODC), which preceded the 2025 session of the Intergovernmental Oceanographic Committee on International Oceanographic Data and Information Exchange	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
14/03/2025	OGS web news (IT and EN)	Marine Data: NODC in Colombia for Two Internationally Relevant Events	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
14/03/2025	OGS post on LinkedIn	L'OGS all' International Ocean Data Conference - III (IODC-III) in Colombia. Nel Corso della conferenza, ospitata dall' Instituto de Investigaciones Marinas y Costeras José Benito Vives de Andreis, a Santa Marta,	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
17/03/2025	OGS-NODC web news (IT and EN)	Colombia: the NODC contributed to two UNESCO events	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
20/03/2025	OGS-NODC X post	Global Partnership on Plastic Pollution and Marine Litter Community of Practice - Our	Keep EMODnet followers up to date on EMODnet	

A. Communication products developed				
Date	Communication material	Short description (of the material, title, …) of the asset	Main results	Name of event at which material was disseminated (if applicable)
		data expert Matteo Vinci (..) represented @EMODnet Chemistry at the workshop "Harmonization of Monitoring and Assessment of Plastic Pollution" (..)	Chemistry's participation in international events	
24/03/2025	OGS-NODC web news (IT and EN)	Plastic pollution: a global event to harmonise monitoring and assessment methods	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
29/03/2025	Chiara Altobelli post on LinkedIn	I am proud to say that I am also part of EMODnet: the European Marine Observation and Data Network 👏 Read its success story in open data below!	Showing EMODnet Chemistry's efforts to streamline data accessibility at the international level	
29/03/2025	Chiara Altobelli post on LinkedIn	Read what Matteo Vinci, data expert and my colleague at the OGS National Oceanographic Data Centre, said after his return from Monaco, where he represented EMODnet Chemistry at the workshop on Harmonization of Monitoring and Assessment of Plastic Pollution of the GPML CoP.	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
31/03/2025	EMODnet web news item/newsletter	Plastic pollution monitoring and assessment: follow-up of the international workshop in Monaco	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
31/03/2025	EMODnet web news item/newsletter	EMODnet at the International Ocean Data Conference III	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
09/04/2025	OGS-NODC X post	Did you follow the event in Genoa where NODC explained its role in the marine knowledge value chain? ….	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
30/04/2025	EMODnet web news item/newsletter	EMODnet's eutrophication and ocean acidification offer is now available on ERDDAP	Showing EMODnet Chemistry's efforts to streamline data accessibility at the international level	

A. Communication products developed				
Date	Communication material	Short description (of the material, title, …) of the asset	Main results	Name of event at which material was disseminated (if applicable)
30/04/2025	EMODnet web news item/newsletter	Marine litter: new guidelines and data products online	Promote EMODnet Chemistry data, products and services	
07/05/2025	OGS-NODC X post	NODC was out in force at the European Geosciences Union (EGU) General Assembly 2025 (..) while Sebastian, Maria Eugenia and Alessandra spoke about @EMODnet Chemistry.	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
08/05/2025	OGS-NODC X post	I know that most of you were not in Vienna to enjoy the General Assembly of the European Geosciences Union. (..)	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
13/05/2025	EMODnet web page (reports)	Chemistry: 5.2 Report on the meeting with the MSFD board of experts on marine litter	Increase visibility of the Board of experts on the MSFD	
30/05/2025	EMODnet web news item/newsletter	Further reflections on EMODnet Chemistry at EGU 2025	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
04/06/2025	OGS-NODC X post	Watch the presentation NODC gave yesterday on EMODnet Chemistry at the One Ocean Science Congress in Nice (..)	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
11/06/2025	OGS-NODC X post	Did you miss us explaining the importance of ocean data on @TgrLeonardo yesterday?	Raising public awareness of the importance of marine data	
16/06/2025	OGS-NODC X post	The NODC is back from the 3rd UN Ocean Conference in Nice and the associated scientific congress, (..)	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
17/06/2025	OGS-NODC X post	GIT2025 - Elena Partescano represents NODC at GIT 2025	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	
27/06/2025	EMODnet web news item/newsletter	Advancing Marine Data Services: EMODnet at OOSC and UNOC3	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	

A. Communication products developed				
Date	Communication material	Short description (of the material, title, …) of the asset	Main results	Name of event at which material was disseminated (if applicable)
30/06/2025	OGS-NODC X post	What a feeling to see so many well-known @EMODnet Chemistry colleagues in this picture	Promote EMODnet Chemistry network	
5 May 2025	OGS-NODC web news (IT and EN)	NODC in force at EGU2025	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	EGU 2025
18/05/2025	OGS-NODC web news (IT and EN)	GARR 2025 Conference: Digital Frontiers	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	GARR 2025 conference
16/06/2025	OGS-NODC web news (IT and EN)	NODC at the UN events for the health of the ocean	Keep EMODnet followers up to date on EMODnet Chemistry's participation in international events	the One Ocean Science Congress (OOSC) and the Third United Nations Ocean Conference (UNOC3)
27/06/2025	Interview published on an Italian web TGnews **"TgrLeonardo"**	Giorgetti of the OGS explains the importance of ocean data	Raising public awareness of the importance of marine data	
31/07/2025	EMODnet web news/ newsletter	Eutrophication-acidity and contaminants: the new data collections submitted to ICES for use by the EEA	Promote use cases for EMODnet Chemistry	
25/08/2025	OGS-NODC X post	Read the recently published article on key issues and recommendations for monitoring seafloor litter through observation and imaging, in which the OGS also participated as coordinator of @EMODnet Chemistry	Promote EMODnet Chemistry's involvement in harmonising European marine litter monitoring and the management of related data.	
15/09/2025	OGS-NODC X post	Watch the event "Environmental Crisis: Scientific data calls for a	Raising public awareness of the importance of marine data for EU policy	

A. Communication products developed				
Date	Communication material	Short description (of the material, title, …) of the asset	Main results	Name of event at which material was disseminated (if applicable)
		change of direction", organised by NODC for @TriesteNext , live on the OGS YouTube Channel on 26 September.		
OGS-NODC X post	OGS-NODC X post	See you at 4.30 pm at the LETS Museum in Trieste for the event in Italian "Crisi ambientale: i dati scientifici reclamano un cambio di rotta"	Raising public awareness of the importance of marine data for EU policy	
29/09/2025	OGS-NODC X post	"Environmental crisis: data requires a change of direction" (...) .	Raising public awareness of the importance of marine data for EU policy	
29/09/2025	OGS-NODC web news (IT and EN)	Pollution and climate change: scientific data speak clearly	Raising public awareness of the importance of marine data for EU policy	
30/09/2025	EMODnet web news/ newsletter	Litter on the seafloor: "Out-of-sight", but not "out of mind"!	Promote EMODnet Chemistry's involvement in harmonising European marine litter monitoring and the management of related data.	
15/10/2025	OGS-NODC X post	NODC-IT @nodcogs 15 ott 14/10/2025 - Proud to have illustrated @EMODnet role in the marine knowledge value chain at International Data Week (...)	Promote use cases for EMODnet Chemistry and its role in the marine knowledge value chain	
15/10/2025	OGS X post	Saluti dall'Australia! NODC dell'OGS all'International Data Week a Brisbane per raccontare come @EMODnet sia un anello fondamentale nella 'marine knowledge value chain' #NODC #marinedata	Promote use cases for EMODnet Chemistry and its role in the marine knowledge value chain	

B. Planned communication products			
Date	Communication material	Short description (of the material, title, …) and/or link to the asset	Main results expected
monthly	EMODnet web news/ newsletter	Launch of the new phase of the project at the KO meeting in Brussels	

B. Planned communication products			
Date	Communication material	Short description (of the material, title, …) and/or link to the asset	Main results expected
November 2025	OGS-NODC X post	Launched the new phase of EMODnet Chemistry at the EMODnet Jamboree 2025	Promotion of the launch of the new project phase at the KO meeting in Brussels
November 2025	OGS X post	Launched the new phase of EMODnet Chemistry at the EMODnet Jamboree 2025	Promotion of the launch of the new project phase at the KO meeting in Brussels
November 2025	OGS-NODC web news (IT and EN)	Launched the new phase of EMODnet Chemistry at the EMODnet Jamboree 2025	Promotion of the launch of the new project phase at the KO meeting in Brussels
November 2025	OGS-NODC X post	A journey through the many uses of EMODnet Chemistry for policy at the EMODnet Jamboree 2025	Promote uses cases for EMODnet Chemistry
November 2025	OGS X post	A journey through the many uses of EMODnet Chemistry for policy at the EMODnet Jamboree 2025	Promote uses cases for EMODnet Chemistry
November 2025	OGS-NODC web news (IT and EN)	A journey through the many uses of EMODnet Chemistry for policy at the EMODnet Jamboree 2025	Promote uses cases for EMODnet Chemistry
November 2025	Presentation (To be agreed with EMODnet Secretariat)	Uses cases for EMODnet Chemistry showcased at EMODnet Jamboree	Promote use cases for EMODnet Chemistry
November 2025	Presentation (To be agreed with EMODnet Secretariat)	EMODnet Chemistry: a link in the marine knowledge value chain	Promote EMODnet Chemistry for policy at the EMODnet Open Conference
November 2025	Presentation (To be agreed with EMODnet Secretariat)	EMODnet Chemistry contribution to the EMODnet Open Conference	Promote EMODnet Chemistry at the EMODnet Open Conference
November 2025	Presentation (To be agreed with EMODnet Secretariat)	EMODnet Chemistry contribution to the EU Digital Forum	Promote EMODnet Chemistry at the EU Digital Forum
November 2025	EMODnet webnews/ newsletter	The Blue Economy Advanced Master. During this event, co-organised by OGS and the University of Trieste, EMODnet was presented as the main infrastructure providing access to multidisciplinary and interoperable data and data products.	Promote EMODnet Chemistry for data fairness

B. Planned communication products			
Date	Communication material	Short description (of the material, title, …) and/or link to the asset	Main results expected
December 2025	EMODnet webnews/ Newsletter	A new use case for the EMODnet section titled "EMODnet marine litter data to estimate macro-litter trend on the European coast"	Highlight the importance of EMODnet Chemistry in addressing marine litter pollution
December 2025	MARE FVG Newsletter	EMODnet Chemistry and Blue Cloud 2026: win-win interaction	Emphasise the importance of international cooperation by fostering synergies between EU-funded projects.
January 2025	EMODnet webnews/ Newsletter	EMODnet Chemistry 2025: Top Five Achievements and Upcoming Challenges	Highlight the main achievements of 2025 and the challenges for the next phase.
January 2025	OGS-NODC X post	EMODnet Chemistry 2025: Top Five Achievements and Upcoming Challenges	Promotion of the launch of the new project phase at the KO meeting in Brussels
January 2025	OGS-NODC web news (IT and EN)	EMODnet Chemistry 2025: Top Five Achievements and Upcoming Challenges	Promotion of the launch of the new project phase at the KO meeting in Brussels

In Table A, list peer reviewed publications directly (co-)authored by consortium and project partners since the start of the project phase. 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 this project phase					
Date of publication	Type of publication	Full reference	ISBN	DOI	Is it open access? Yes/No
30/10/2023	paper	French, M. A., & Lipizer, M. Improving data reliability to support marine pollution assessment according to MSFD Descriptor 8 in the European Seas: the contribution of EMODnet Chemistry. Frontiers in Marine Science, 10, 1275097.		https://doi.org/10.3389/fmars.2023.1275097	Yes
October 2023 (online version) Dec 2023 (print version)	paper	Murray, C. J., van Bavel, B., Kideyş, A. E., Lusher, A. L., Reker, J., Šubelj, G., & Andersen, J. H. (2023). Development and testing of a prototype indicator-based tool for identification of potential problem areas for marine litter in Europe's seas. Science of the Total Environment, 905, 167096.		https://doi.org/10.1016/j.scitotenv.2023.167096	Yes

A. (Co-)Authored peer-reviewed publications in this project phase					
Date of publication	Type of publication	Full reference	ISBN	DOI	Is it open access? Yes/No
01/12/2023	paper	Molina Jack, M. E., Altenburger, A., Caer, G., Cociancich, A., Fortibuoni, T., Galgani, F., ... & Vinci, M. (2023). A Mediterranean Focus Overview of EU Marine Litter Data Management Performed in the Framework of the European Marine Observation and Data Network Chemistry. Sustainability, 15(23), 16490.		https://doi.org/10.3390/su152316490	Yes
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
18/04/2025	Methodology document	Gaudin F., Caër G., Molina Jack M. E., Vinci M., Altenburger A., Cociancich A, Fortibuoni T., Le Moigne M., Giorgetti A., Partescano E., Thomas A., 2025. Visualization products for floating micro-litter data – 13p		https://doi.org/10.13120/skvs-yz64	Yes
May 2024	Conference proceedings	S. Simoncelli, M. Vernet, C. Coatanoan (Eds), (2024). International Conference on Marine Data and Information Systems Proceedings Volume, IMDIS 2024 Bergen (Norway) 2729 May 2024, Misc. INGV, 80: 1398.		https://doi.org/10.13127/misc/80	Yes
June 2025 (online) December 2025 (paper version)	Paper	Hanke, G., Canals, M., Nakajima, R., Bergmann, M., Galgani, F., Li, D., ... & Zhang, S. (2025). Out of sight, but not out of mind: Key issues regarding seafloor macrolitter monitoring: Issued by the expert community "International Seafloor Macrolitter Imaging and Quantification". Marine pollution bulletin, 221, 118500.			Yes

B. Other/non-peer reviewed types of publications (co-)authored in this project phase					
Date of publication	Type of publication	Full reference	ISBN	DOI	Is it open access ? Yes/No
10/12/2024	Guidelines	M. A. French, E. Partescano, M. Lipizer 2024 Guidelines for compiling EMODnet Chemistry template/questionnaire on methodologies and QA/QC information and for including its DOI in the CDI/standard metadata. Pp. 7		https://doi.org/10.13120/4GCK-Q240	Yes
10/12/2024	Guidelines	E. Partescano, A. Altemburger, A. Giorgetti , M. Lipizer, M.A. French, M.E. Molina Jack (OGS), M. Fichaut, J. Gatti (Ifremer), D. Schaap (Maris) Guidelines to include complete metadata in the CDIs for EMODnet Chemistry data		https://doi.org/10.6092/E25B219F-B17D-411E-A0EE-E12DB5685E23	Yes
24/07/2025	Guidelines	Molina Jack M.E., French M.A., Lipizer M., EMODnet Chemistry: Guidelines to merge profile and time series data types (eutrophication and contaminants).		https://doi.org/10.13120/4yb9-6470	Yes

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

9 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	CDI catalogue service	Circa 78.000 new data sets have been entered in the contract period.
What is your opinion on the data coverage within EMODnet for your thematic?	The sea regions in the CDI service have been reformulated to follow the latest EEA regional polygons. This was considerable effort but is now in place.	The data coverage is very good for all European seas and there is a steady increase for most regions
B) Usage of data since the start of the project phase	CDI RSM shopping ledger service and personal requests	The number of CDI downloads is higher (+37%) than in the previous contract period.
2. Current status and coverage of total number of data products A) Volume and coverage of available data products	Sextant Product Catalogue	During the reporting period, a notable positive trend in the data products was observed in all sea regions.
B) Usage of data products since the start of the project phase	Download Tracking service for data products	Please note that numbers and volumes are underestimated because the system set up by OGS after EMODnet centralisation to collect logs from the providers of EMODnet Chemistry data products was fully operational only from report Q4 2024 onwards. In particular, it was not operational for Q1 2024; the system provided the number of downloads for some products for Q2 2024, and the number of downloads for all

Comments on the progress indicators in the indicators spreadsheet		
Progress indicator	Means of collecting figures	Comment
		products and the number of visualisations (not for all products) for Q3 2024. The trend in the production of data products on contaminants is not available because in the previous final report the subgroups were counted together.
3. Internal and external organisations supplying/approached to supply data and data products since start of the project phase	CDI catalogue service	New data have been supplied by 37 regular data providers. Also some de-activation took place because of identified errors or re-organisation of data. Moreover, data from 2 data providers were populated by other data centres.
4. Online 'Web' interfaces to access or view data	N.A.	Updates for contaminants maps and CSW service
5.1. Daily number of page views of EMODnet Thematic entry page since the start of the contract	Europe Analytics	The daily number of page views is irregular and decreases during public holidays in December and in summer. In the first quarter, we recorded a maximum of around 40 visitors per day; in the last quarter, a maximum of around 30 visitors per day.
5.2. Total number of visitors, page views, unique page views and percentage of returning visitors, since the start of the contract	Europe Analytics	These statistics also show a notable positive trend for all indicators except the percentage of returning visitors.

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

10 Recommendations for follow-up actions by the EU

EMODnet Chemistry continues to play a pivotal role as the **European data platform for Descriptor 10 of the MSFD**, providing robust support for the exchange of data and information on beach litter, floating micro-litter, and seafloor litter. Building on this foundation, there is a clear opportunity to expand its scope to include macro-litter data derived from image analysis. In collaboration with EMODnet Data Ingestion, efforts are also underway to explore the integration of citizen science data, aiming to standardise and incorporate this valuable resource into the broader marine data ecosystem. The successful experience with marine litter has enabled the EU Joint Research Centre (JRC) to deepen its understanding of EMODnet Chemistry's data structures, formats, and metadata protocols, and to assess the availability of data relevant to Descriptors 5, 8, and 9. With its extensive pan-European network of data centres, EMODnet Chemistry is well positioned to meet the MSFD requirements for chemical indicators across these descriptors.

The **synergy between EMODnet Chemistry and the SeaDataNet infrastructure is fundamental** to daily operations. However, the lack of sustainable funding for SeaDataNet, currently represented by an AISBL, poses a significant risk. All data providers rely on SeaDataNet tools for data preparation, validation, and delivery. In a rapidly evolving technological landscape, even a few years without investment can render infrastructure obsolete. SeaDataNet stands as a model of interoperable and reusable data infrastructure, offering consolidated vocabularies, shared data formats, rich metadata, and robust tools for data management and sharing. Yet, this entire system is at risk. For example, the absence of a dedicated formatting tool for micro-litter data has led to inconsistencies and errors, undermining harmonisation efforts. **Adequate research and innovation funding is therefore essential to maintain and evolve this expert network**, which connects observation systems and monitoring agencies with European infrastructures such as EMODnet, CMEMS, Blue-Cloud, and EOSC, and plays a key role in aggregating and managing marine data.

Strengthening the role of data centres will also enhance coordination of in-situ marine data activities at both regional (e.g. Regional Sea Conventions) and European levels (e.g. EMODnet), **improving the workflow between fast data delivery and delayed mode standards**, and helping to close the gap between operational and long-term data systems. The effort required to enrich data with appropriate metadata and ensure long-term preservation should be recognised, and the quality of EMODnet Chemistry data products should be valued within initiatives such as EDITO-Infra.

To further align EMODnet Chemistry with the evolving objectives of the MSFD, it is recommended to **extend its thematic coverage** to include emerging contaminants, biological effects, and litter in biota – areas currently outside its scope but increasingly relevant. These domains demand dedicated expertise and sustained effort. Moreover, synchronising overarching policy timelines with project-specific schedules for data delivery would improve coordination and ensure that stakeholder expectations are met effectively.

11 Annex: Other documentation attached

Generating aggregated and validated data collections in the Baltic Sea – SMHI

During 2023–2025, two eutrophication–acidification collections, and two contaminant collections were created and delivered for the Baltic Sea. The first collection is described in the interim report. During the first harvest, only new and updated data were quality controlled and then merged with the previous collection. In the second harvest, all data (new, updated and old) were quality controlled. A new metadata field was added to the collections: Location qualifier [Beyond the 12 NM boundary, Landward side of the 12 NM boundary].

Eutrophication and Ocean Acidification data collection in the Baltic Sea

The second harvest was received in December 2024. After aggregation and quality control of all data the final collection included 210747 vertical profiles and 157 timeseries (Table 1). See Figures 1 and 2 for the spatial and temporal distributions of the data. New P35 parameters, such as DIC, inorganic sulphur, POC, PON, and DOC, as well as more ancillary parameters are now included. The number of vertical profiles has decreased since 2024 due to the identification and removal of duplicates. The number of timeseries has increased since 2024 because older CDIs with no P35 parameters and only ancillary have now been included.

Table 1. Numbers of data providers and CDIs of the final aggregated Eutrophication collection in the Baltic Sea.

CDI-Partners	Originators	Countries	#CDIs	% Unrestricted
15	74	9	Vertical profiles: 210747 Time series: 157	Vertical profiles: 98 % Time series: 100 %

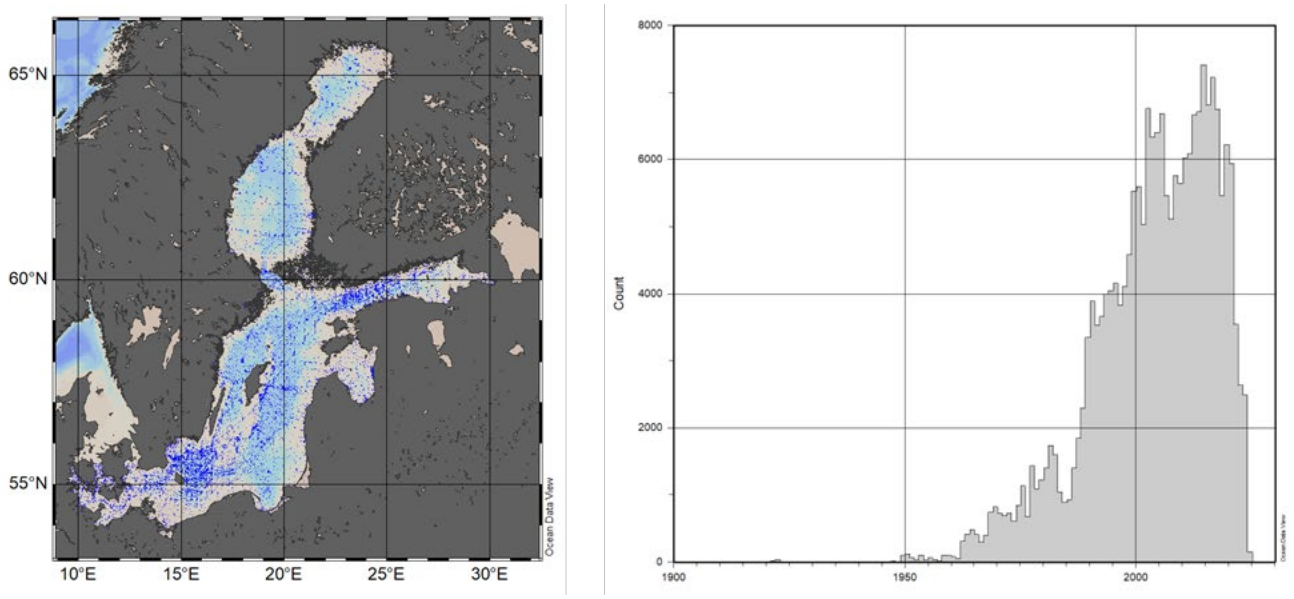


Figure 1. Spatial (to the left) and temporal (to the right) distribution of eutrophication–acidification vertical profile data in the Baltic Sea region.

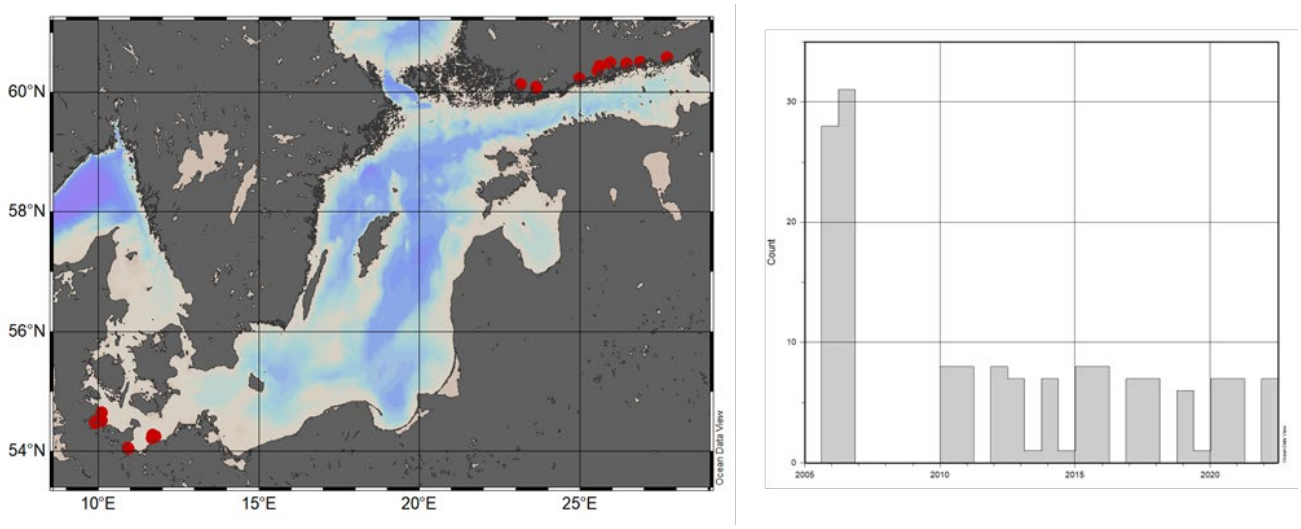


Figure 2. Spatial (to the left) and temporal (to the right) distribution of eutrophication–acidification time series data in the Baltic Sea region.

Quality control

ODV version 5.8.2 was used to aggregate and to quality control data according to the document EMODnet Chemistry Regional sea eutrophication data collection and Quality Control loop - 2023 (https://nodc.ogs.it/catalogs/doidetails?4&doi=10.13120/8xm0-5m67). The main QC steps were: apply P35 aggregation, check format/file errors, check duplicates, check broad range, check for nutrients inorganic/total ratio for N and P, check values under detection limit and zero values. When not present in the original data, 'Water body nitrate plus nitrite' was calculated by summing nitrate and nitrite. The same procedure was applied for 'Water body dissolved inorganic nitrogen (DIN)', which was calculated by summing nitrate, nitrite and ammonium. 'Water body nitrate plus nitrite' and 'Water body DIN' calculations were performed using the ODV Software tool (derived variables). All Argo profiles were removed from the collection as they were not in the adjusted mode status and considered wrong. The total number of vertical profiles, total number of values, and total number of good/bad flagged data per P35 parameter is presented in Table 2.

Key issues

Duplicates were identified and removed; for example, the same data had been reported/submitted by two data providers but this was not discovered in previous harvests. Several stations have missing bottom depths and bottom depths less than the maximum sample depth. Data where the value = 0 are not always updated with QF = 6. Several data had mismatches between the Local_CDI_Id or EDMO code in the ODV data files and data.csv files and could not be used in the collections. All ARGO profiles had to be removed because of further processing needed from the data provider.

Table 2. Total number of CDIs and values and total number and % of good/bad flagged data per P35 parameter for vertical profiles. Good data is the sum of data with QF=1, 2, 5, 6, 7, 8, Q and bad data is the sum of data with QF=3, 4. Timeseries are only a minor amount of data and is not presented here, however, all timeseries data were considered good.

P35 Parameter	# CDI	# Values	# Good	% Good	# Bad	% Bad
Depth	210747	4989668	4988689	99,98	979	0,02
Water body dissolved oxygen concentration	160387	3737121	3519987	94,19	217134	5,8
Water body dissolved oxygen saturation	2773	11896	11635	97,81	261	2,19
Water body nitrate	38479	237937	237878	99,98	59	0,02
Water body nitrate plus nitrite_origin	71590	225881	224767	99,51	1114	0,49
Water body nitrite	42908	287228	287176	99,98	52	0,02
Water body phosphate	114276	508630	507121	99,7	1509	0,3
Water body silicate	85860	387707	386753	99,75	954	0,25
Water body ammonium	91568	408446	407300	99,72	1146	0,28
Water body chlorophyll-a	86255	667501	660760	98,99	6739	1,01
Water body total alkalinity	7705	63770	63512	99,6	258	0,4
Water body total nitrogen	97582	413059	412041	99,75	1018	0,25
Water body total phosphorus	96637	421810	420667	99,73	1143	0,27
Water body particulate organic carbon {POC}	1182	2813	2813	100	0	0
Water body pH	32868	353156	333205	94,35	19951	5,65
Water body inorganic sulfur	6945	24058	24045	99,95	13	0,05
Water body uncalibrated oxygen sensor data	7979	869577	858763	98,76	10814	1,24
Water body nitrate plus nitrite	105986	446173	444975	99,73	1198	0,27
Water body dissolved inorganic nitrogen	87763	391100	389653	99,63	1447	0,37

Contaminants Collection in the Baltic Sea

The second harvest was received in December 2024. The harmonisation process has been improved with more variables now being harmonised. After harmonisation and quality control the of all data the collections now include 1212 biota profiles, 2021 sediment profiles, 3005 water profiles and 540 biota timeseries (Table 2). See Figure 3 for the spatial and temporal distributions of the data.

Table 2. Numbers of data providers, CDIs, and parameters of the final harmonised contaminant collection for the Baltic Sea.

Baltic Sea	Partners	Originators	Countries	# Vertical profiles (CDIs)	# Harmonised P01 codes	%Unrestricted
Water profiles	6	12	4	3005	65	45
Sediment profiles	10	28	9	2021	319	99
Biota profiles	5	10	5	1212	470	100
Biota time series	3	3	3	540	170	100

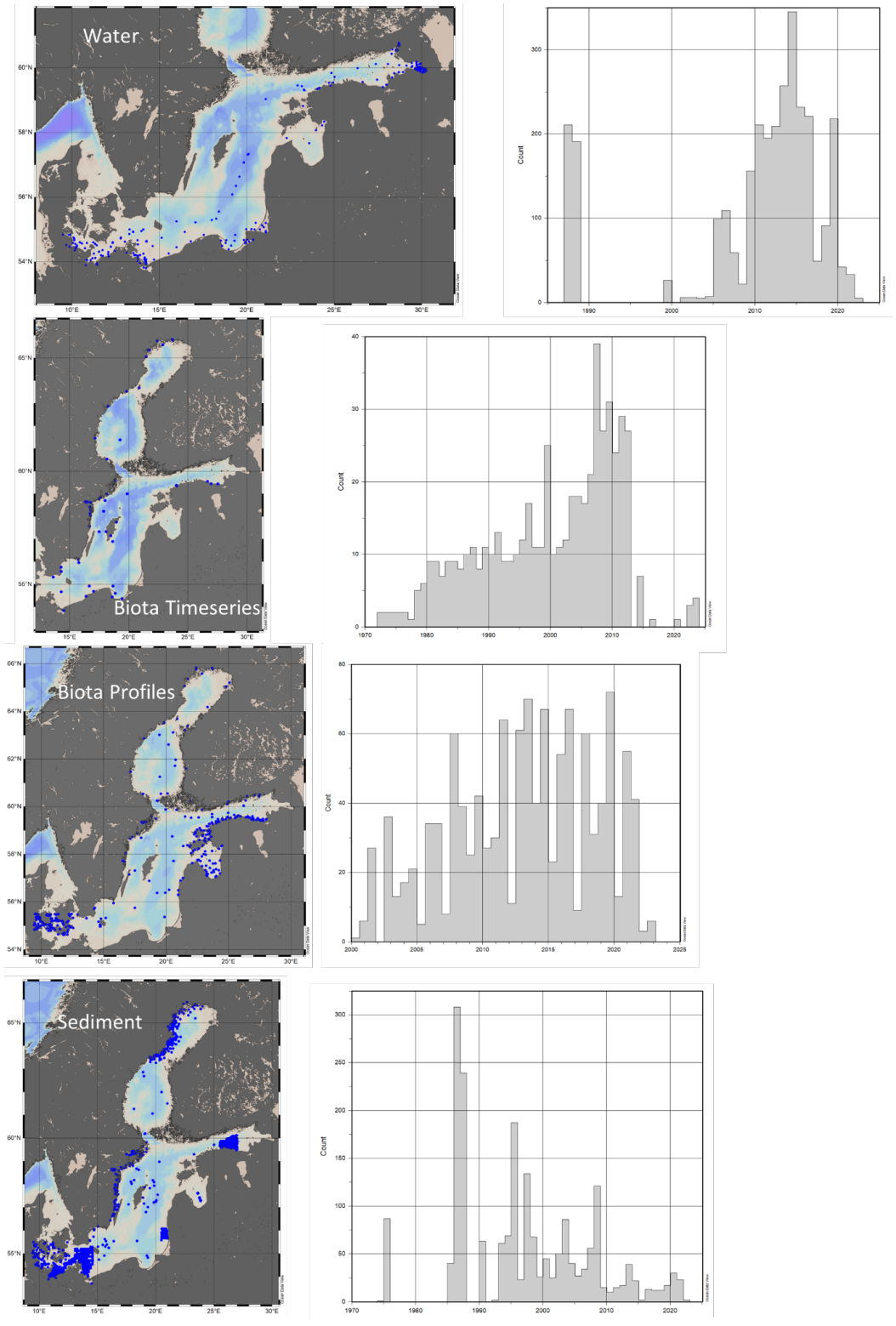


Figure 3. Spatial (to the left) and temporal (to the right) distribution of contaminant data in the Baltic Sea region.

Quality control

The complete Quality Control is described in "Quality Control steps and dataset formats for EMODnet Chemistry Contaminant aggregated datasets, v2021" (https://emodnet.ec.europa.eu/en/tools-guidelines#chemguidelines; https://nodc.ogs.it/catalogs/doidetails;jsessionid=572B7292C3AD3C20A26056E3D985F780?0&doi=10.6092/8b52e8d7-dc92-4305-9337-7634a5cae3f4)

The large heterogeneity in the contaminant data due to different matrices, parameters, protocols, units, limited temporal–spatial distribution, and a limited knowledge on concentration ranges for the variables, lead to a very basic quality control of these datasets. The main QC steps were: separation of data related to different matrices into different collections, check the consistency of primary variables, harmonisation of units and parameter naming, check the format errors and inconsistent units, duplicates, and negative values. The number of CDIs separated into P36 groups are presented in Table 3.

Table 3: Total number of stations (CDIs) for contaminants per matrix after harmonisation in the final collection in the Baltic Sea.

P36 Parameter group	Water	Sediment	Biota	Biota time series	Total
Total no. of Antifoulants stations	0	148	229	9	386
Total no. of Hydrocarbons stations	2207	729	478	30	3444
Total no. of Heavy Metals stations	734	1724	966	434	3858
Total no. of PCBs stations	85	237	517	343	1182
Total no. of Pesticides stations	937	152	372	423	1884
Total no. of Radionuclides CDIs	342	186	92	7	627

Key issues

There were some issues when the bottom depth was set to 0. There were also some questionable sediment data with large sediment depths. Several data had mismatches between the Local_CDI_Id or EDMO code in the ODV data files and data.csv files and could not be used in the collections. All issues have been communicated to the data providers.

Generating aggregated and validated data collections in the Black Sea – NIMRD

During 2023–2025 (the second phase of EMODnet Chemistry 5) two eutrophication–acidification collections and two contaminant collections were delivered to NIMRD (Regional Leader for the Black Sea). During the first harvest (February 2024), only new and updated data were quality controlled and then merged with the previous collection. The first aggregated and quality-controlled collections (eutrophication–acidification and contaminants, v2024) are described in the interim report.

Eutrophication and ocean acidification data collection

In mid-December 2024, NIMRD received the second harvest of eutrophication–ocean acidification data (new and updated plus old) for the Black Sea (Black Sea, Sea of Azov, and Sea of Marmara) as zip files (containing ODV txt and metadata csv files) from MARIS.

With this harvest a new metadata field "Location qualification" was introduced with two values: *Landward side of the 12 NM boundary* (datasets located in coastal areas) and *Beyond the 12 NM boundary* (datasets located in open sea).

At the request of the MSFD board of experts and JRC experts, new parameters were aggregated and quality controlled (QCed) (e.g. inorganic sulfur, organic and particulate carbon, and particulate nitrogen) and more ancillary parameters (temperature, salinity, Secchi depth, turbidity, total suspended matter) were kept in the aggregated collections.

Considering the novelties introduced with this harvest, it was decided that the quality control would be performed on the whole harvest (old, new and updated).

After dealing with file format errors/warnings, duplicates, and quality control checks, the v2025 Black Sea aggregated eutrophication–ocean acidification collection dataset contained a total of 74541 vertical profiles and 11 time series (Table 1). The spatial and temporal distributions are shown in Figure 1.

Table 1. Total numbers of providers, CDIs, time span and percentage of restricted of v2025 QCed aggregated eutrophication data collections for the Black Sea

	Profiles	Timeseries
Partners / Originators / Countries	30 / 46 / 9	3 / 2 / 2
No. CDIs	74541	11
Time period	1935-2024	2003-2023
Restricted data (%)	12.76 %	0 %

The spatial distribution maps (Figure 1) show good data coverage in the Black Sea basin, whereas data are sparse in the Azov and Marmara seas. The vertical profiles are concentrated along the coastal areas, especially in the north-western part of the Black Sea and in the Bosporus and Kerch strait areas. Time series data are sparse and only available in the north-western part of the Black Sea.

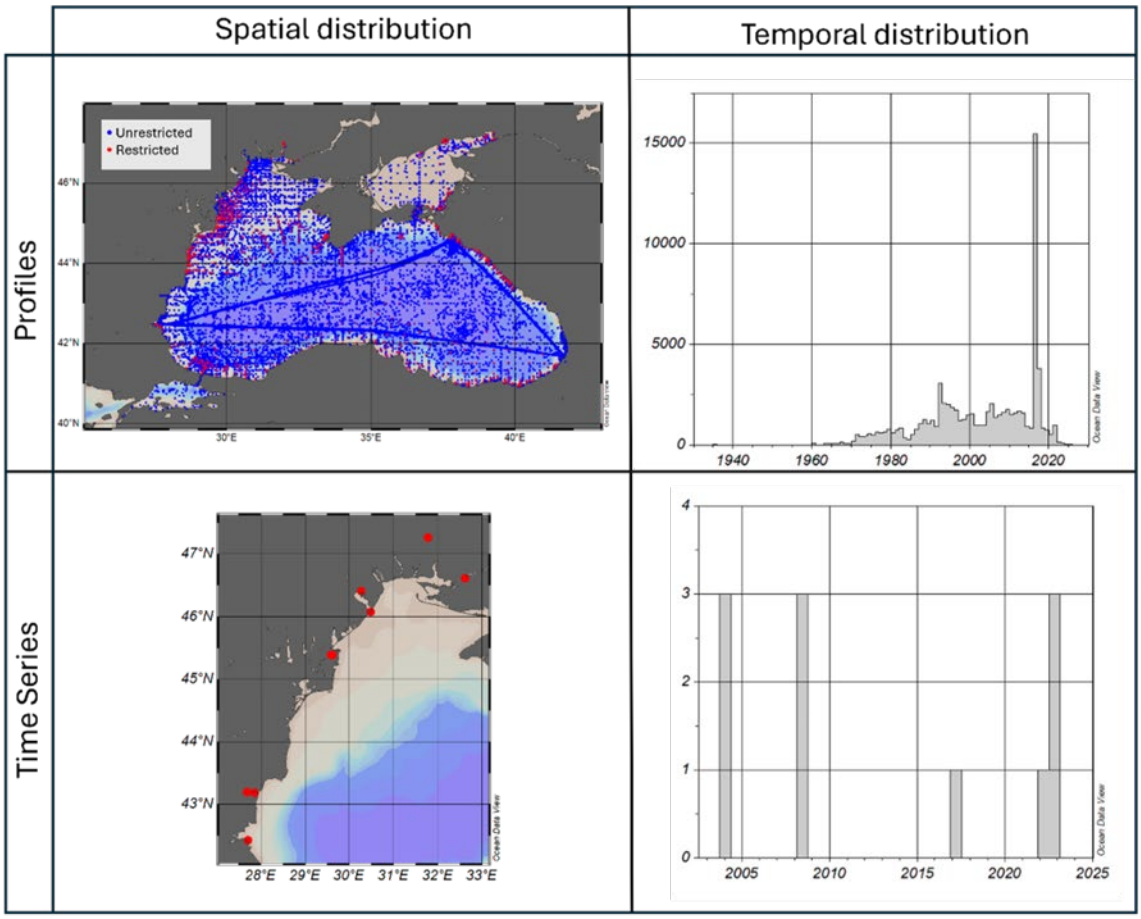


Figure 1. Spatial (left) and temporal (right) distributions of vertical profiles (up) and timeseries (down) of QControlled aggregated eutrophication and ocean acidification data in the Black Sea.

Quality control of eutrophication data

ODV 5.8.2.2 (latest version) and the common project methodology (fully described here: https://doi.org/10.13120/8xm0-5m67) were used to i) aggregate CDI metadata and ODV files into a metadata enriched ODV collection, ii) aggregate variables codes from P01 to P35 (while keeping the P01 and P06 codes inside the data collection), and iii) quality control the data.

The Argo float profiles in near real time (NRT) or delayed mode (DM) not adjusted and/or that were not validated were removed from the collection. Some other profiles were removed due to the wrong P02 in the CDIs (sediment data with a eutrophication P02 in the metadata).

High values (out of range) in the coastal areas or in front of river mouths (data with metadata "Location qualification" = *Landward side of the 12 NM boundary*) are known to be high and, therefore, were not flagged as bad.

The QCed aggregated eutrophication–ocean acidification dataset for the Black Sea contained 97.46% "good" data and 2.54% "bad" data for the vertical profiles, and 90.04% "good" data and 9.96% "bad" data for the time series ("good" data are flagged with QF = 1, 2, 5, 6, 8, and Q and "bad" data with QF = 3, 4). Table 2 summarises

the total number of vertical profiles (VP) and time series (TS), total number of values, and total number of "good" flagged data per P35 aggregated parameter.

Table 2. Total number of vertical profiles and timeseries and measurements and percentage of "good" data per P35 parameter for both vertical profiles (VP) and timeseries (TS) in the Black Sea collections after QC.

NS: not sampled.

P35 Parameter	No. of VP	No. of meas. VP	%good VP	No. of TS	No. of meas. TS	%good TS
dissolved oxygen concentration	62513	1045074	93.21	8	57166	89.49
dissolved oxygen saturation	8263	64427	92.95	7	57114	89.48
phosphate	30236	109810	96.54	7	737	99.86
total phosphorus	11495	25617	94.82	3	158	100.00
silicate	26592	89600	99.34	3	158	100.00
nitrate	17962	52873	93.45	7	738	99.86
nitrate plus nitrite_origin	2912	22845	98.52		NS	NS
nitrite	23979	80035	93.85	7	738	99.59
total nitrogen	11442	24923	97.38	4	429	99.07
ammonium	21937	59198	97.63	7	726	100.00
pH [pH units]	31081	95355	99.27	3	152	100.00
total alkalinity [mEquiv/l]	13103	30980	96.48	3	295	100.00
chlorophyll-a [mg/m^3]	21220	50637	94.60	1	284	100.00
nitrate plus nitrite	20640	74735	94.48	7	738	99.59
dissolved inorganic nitrogen (DIN)	16830	48791	94.33	7	726	99.59
dissolved inorganic nitrogen (DIN)_origin	38	121	98.35	NS	NS	NS
organic phosphorus	782	1117	100.00	NS	NS	NS
dissolved phosphorus	487	2412	99.59	3	295	100.00
particulate phosphorus	85	348	99.71	NS	NS	NS
organic nitrogen	771	1105	100.00	NS	NS	NS
particulate nitrogen	128	503	99.01	NS	NS	NS
dissolved organic carbon {DOC}	1116	4558	97.54	NS	NS	NS
particulate organic carbon {POC}	136	541	99.26	NS	NS	NS
inorganic sulfur	7692	20782	96.84	NS	NS	NS

Contaminant data collections

In mid-December 2024, NIMRD received the second harvested contaminant data (new and updated plus old) for the Black Sea as zip files (containing ODV and metadata csv files).

After dealing with file format errors/warnings, duplicates, and quality control checks, the v2025 Black Sea harmonised and QCed contaminant dataset contained a total of 35928 vertical profiles (Table 3). The spatial and temporal distributions per matrix are shown in Figure 2. The contaminant data exhibit non-uniform temporal and spatial distributions: for water, contaminant data are available over the entire basin, whereas sediment and biota data are mostly only available in coastal areas. There are no contaminant data as time series for the Black Sea.

Table 3. Total numbers of providers, CDIs, time span and percentage of restricted harmonised contaminant collections for the Black Sea.

	Water	Sediment	Biota
Partners / Originators / Countries	14/ 23/ 6	10 / 12 /6	3 / 3/ 3
No. CDIs	30515	4886	527
Time period	1960-2023	1987-2023	1982-2019
Restricted data (%)	38 %	57 %	93 %

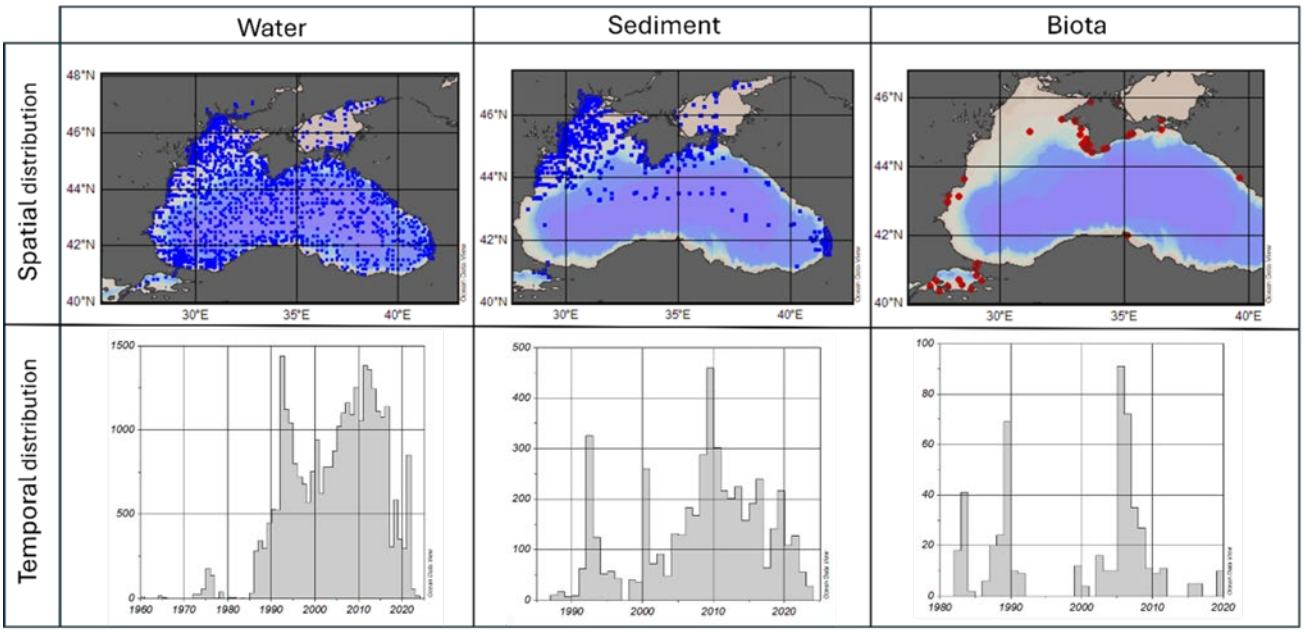


Figure 2. Spatial and temporal data coverage of Black Sea harmonized and QControlled contaminants vertical profiles data

Quality control of contaminant data

ODV 5.8.2.2 (latest version) and the common project methodology (fully described here: https://doi.org/10.6092/8b52e8d7-dc92-4305-9337-7634a5cae3f4) were used to i) aggregate CDI metadata and ODV files into a metadata enriched ODV collection, ii) harmonise the P01 codes (while keeping the P01 and P06 codes inside the data collection), and iii) quality control the data. The QC was mainly performed on the data formats (as mismatches between the semantic header and header; wrong primary variable (ADEPZZ01 instead of COREDIST for sediment data); mixed water data with sediment data; wrong units for the

primary variable; wrong P01 and /or P06 codes; mismatches between P02s in the metadata and the P01/P06 in the data; depth ≠ 0 in sediment profiles).

In the harmonised collections, all QF = 0 (including for depth) were changed to QF = 1; for values equal to 0 and QF≠ 6, flags were changed QF = 6. The flags for negative values (except for temperature) were changed to QF = 4. Some profiles were removed as they were mixed contaminant data (sediment and water data in the same file). Owing to the high number of harmonised P01 codes and the variability of spatial coverage (coastal and open seawater), the broad range check for each P01 was not possible; instead, only extremely high values were flagged with QF = 4. The final QCed harmonised contaminant datasets for the Black Sea (v2025) contained a total of 30515 vertical profiles for water, 4886 vertical profiles for sediment, and 527 for biota. The distribution of data over the three matrices and contaminants per P36 parameter group is summarised in Table 4.

Table 4. Total number of stations (CDIs) for contaminants per matrix after harmonisation of the Black Sea collection

P36 Parameter group	Water	Sediment	Biota	Total
Total no. of Antifoulants stations	80	no data	no data	80
Total no. of Hydrocarbons stations	24771	1852	10	26633
Total no. of Heavy Metals stations	3772	2437	323	6532
Total no. of PCBs stations	1307	939	193	2439
Total no. of Pesticides stations	14051	1739	66	15856
Total no. of Radionuclides CDIs	1597	41	no data	1638

Key issues

Most of the work involved finding and flagging bad and questionable values. The main issues, and the most time-consuming work, was handling formatting errors in the ODV files. Most of these errors were obvious and action was taken to correct them.

The feedback loop between the Black Sea regional leader and the partners during the previous EMODnet Chemistry Phases was a very useful and productive activity, which improved the quality of the regional data. Issues were reported in detail to the data providers with explanations on how to correct their data. Nevertheless, not all CDIs and ODV files were correctly updated (or updated at all).

The number of vertical profiles (in both in eutrophication and contaminant data collections) has decreased compared with previous harvests because one data provider temporally removed datasets for further corrections.

The low number of new datasets submitted is most likely due to the geo-political situation in the Black Sea region, which prevented some partners from submitting their data, resulting in poor spatiotemporal coverage in recent years.

Generating aggregated and validated data collections in the Arctic region – IMR

The contribution to WP3 during EMODnet Chemistry 5 for 2023–2025 by IMR, as regional leader for the Arctic, focused on data aggregation, quality control, and validation of two harvests of eutrophication–ocean acidification data and two harvests of contaminant data.

Eutrophication and ocean acidification data collection

In February 2024, IMR received the first harvest related to eutrophication–ocean acidification data for the Arctic region. QC steps were only performed on new and updated data, as described in the interim report. After aggregation and QC, the "new and updated" ODV collection was merged with the 2023 collection.

The second harvest of eutrophication–ocean acidification data was received in December 2024. This time, all the data were QCed. New P35 codes were generated, new parameters were added to existing P35, and more ancillary parameters were included in the collections. Also, a new metadata field called *Location qualifier* was added.

Table 1 shows the numbers of data and data providers in the Arctic eutrophication collection for the last three harvests, 2023–2025.

Eutrophication	Partners	Originators	Countries	CDI/Vertical profiles	Restricted (%)
2023 collection	**12**	**51**	**11**	**57 598/141 988**	**0.7**
2024, 1. harvest	**12**	**51**	**12**	**55 594/146 366**	**0.7**
2025 collection	**12**	**50**	**12**	**55 007/145 713**	**0.7**

Table 1. Numbers of data providers, CDIs/profiles and restricted data for eutrophication data in the Arctic for the last 3 harvestings. The lower number of data since 2023 is explained under *Key issues*.

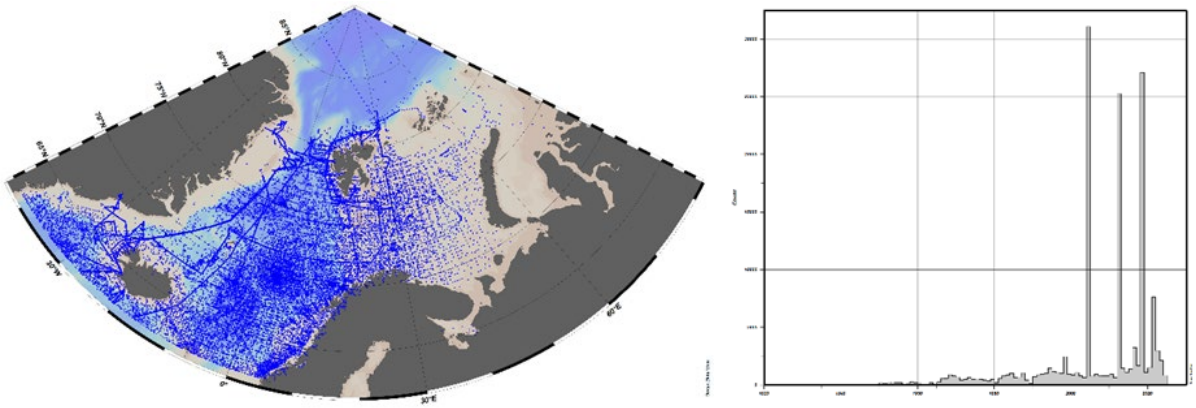


Figure 1. Spatial (left) and temporal (right) distribution of Eutrophication and acidification vertical profiles in the Arctic region.

Figure 1 shows the spatial and temporal distributions of the merged data collection. The spatial coverage is good in most of the region from 62°N to 82°N, with less data along the East Greenland coast and in the eastern area of the Barents Sea. Most of the data were collected between 1965 and 2024, with peaks in 2004, 2012 and 2018 due to high frequency trajectory data.

Quality control of eutrophication dataset

ODV version 5.8.1 was used to aggregate and QC the data according to the document "EMODnet Chemistry Regional sea eutrophication data collection and Quality Control Loops" - v2023 (https://dx.doi.org/10.13120/8XM0-5M67).

P35 parameter	Profiles	Values	# Good	% Good	# Bad	% Bad
Depth	145 713	11 992 872	11 984 123	99.9	8 749	0.1
Water body dissolved oxygen concentration	30 863	5 426 642	5 135 472	94.6	291 170	5.4
Water body dissolved oxygen saturation	1 335	317 424	283 958	89.5	33 466	10.5
Water body nitrate	27 624	444 170	382 353	86.1	61 817	13.9
Water body nitrate + nitrite (original)	344	3 871	3 638	94	233	6
Water body nitrite	26 489	283 613	282 588	99.6	1 025	0.4
Water body phosphate	37 163	399 678	397 167	99.4	2 511	0.6
Water body silicate	32 707	367 325	356 168	97	11 157	3
Water body ammonium	676	3 081	3 068	99.6	13	0.4
Water body chlorophyll-a	110 326	4 463 617	3 625 272	81.2	838 345	18.8
Water body phaeopigments	18 720	130 855	130 847	100	8	0
Water body total alkalinity	493	2 918	2 308	79	610	21
Water body dissolved inorganic carbon	268	268	267	99.6	1	0.4
Water body total nitrogen	7	35	35	100	0	0
Water body total phosphorus	51	214	199	93	14	7
Water body particulate organic carbon	121	380	380	100	0	0
Water body pH	7 612	662 072	228 357	34.5	433 715	65.5
Water body dissolved organic carbon	33	205	205	100	0	0
Water body particulate nitrogen	123	547	547	100	0	0
Water body nitrate plus nitrite	27 960	447 898	384 943	85.9	62 955	14.1
Water body dissolved inorg. nitrogen	99	979	752	76.8	227	23.2

Table 2. Total number of profiles and measurements, and total number and % of good (QF=1,2,5,6,8,Q) and bad (QF=3,4) values.

The main QC steps were: P35 aggregation, check for format errors and duplicates, broad range checks, and checks for negative values, values under detection limit and zero values. Profiles with only temperature and salinity were removed from the collection. ARGO profiles where none of the parameters were validated yet were also removed, unless the profiles were obviously good. If any of the ARGO parameters in a profile were validated, the profile was kept in the collection, and unvalidated parameters were assigned QF = 3 (if not done already).

Table 2 shows the total number of profiles and measurements in the merged collection, and the number and percentage of good and bad data values. Parameters where a large part of the data come from ARGO floats have a lower percentage of good data than previously due to data that had not yet been validated (with QF = 3). Some parameters with very few profiles have a low percentage of good data, particularly dissolved inorganic nitrogen.

Contaminants data collection

The first harvest of contaminant data was received by IMR in March 2024. The new and updated data collection contained only 19 updated sediment depth profiles, and no new data.

The second harvest was received in December 2024 and contained 12 new and 56 updated profiles in sediment from 1 partner, whereby 32 new parameters had been added to the updated profiles since the first harvesting. As for eutrophication, all the data (new, updated and old) was QCed this time.

Quality control of contaminant dataset

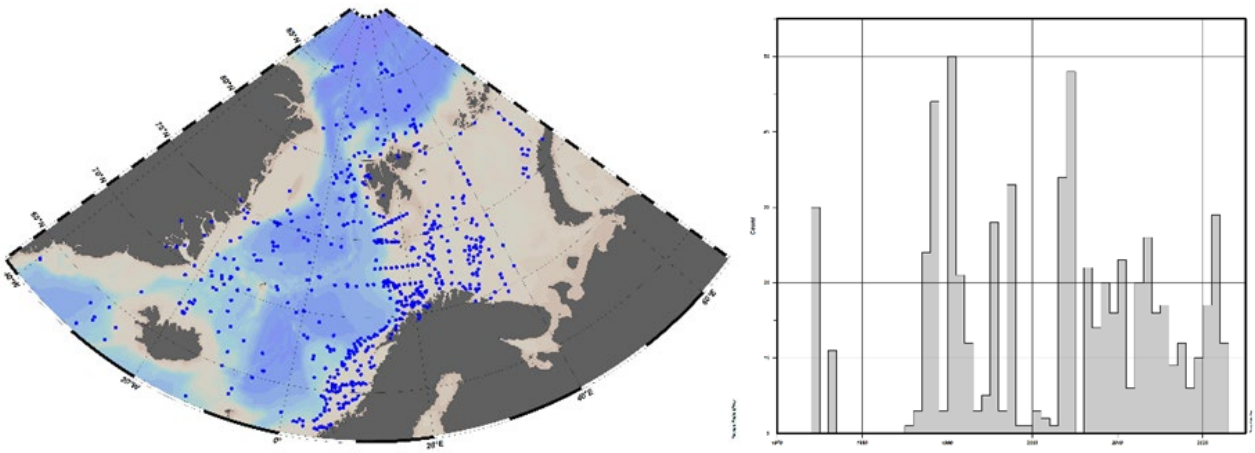
ODV version 5.8.1 was used to harmonise and QC the data according to the document "Quality Control steps and dataset formats for EMODnet Chemistry Contaminant aggregated datasets, v2021" (https://doi.org/10.6092/8b52e8d7-dc92-4305-9337-7634a5cae3f4).

The main QC steps were: harmonisation, checks for format errors and duplicates, check for data with QF = 0 or zero values with QF = 1, and checks for negative values and profiles without contaminant parameters. Many parameters had only one or a few measurements, so broad range checks were not possible. The errors found were mainly wrong primary variable (ADEPZZ01 instead of COREDIST for sediment data), and wrong units for primary variable.

Table 3 shows the details for the total merged sediment and water collections, and Figure 2 shows the spatial and temporal distributions of contaminant data. Spatial coverage is best for the sediment data, while there is no data in the Barents Sea in the water collection.

Contaminants	Partners/ Originators	Time period	CDIs/ profiles	Harmonised parameters	Restricted (%)
Sediment profiles	**3/10**	**1974-2023**	**636**	**140**	**0**
Water profiles	**4/6**	**1974-2017**	**1012**	**25**	**77**

Table 3. Numbers of data providers, years with data, CDIs/profiles, harmonised parameters and restricted data for contaminants data in the Arctic. There is no biota or time series data available.



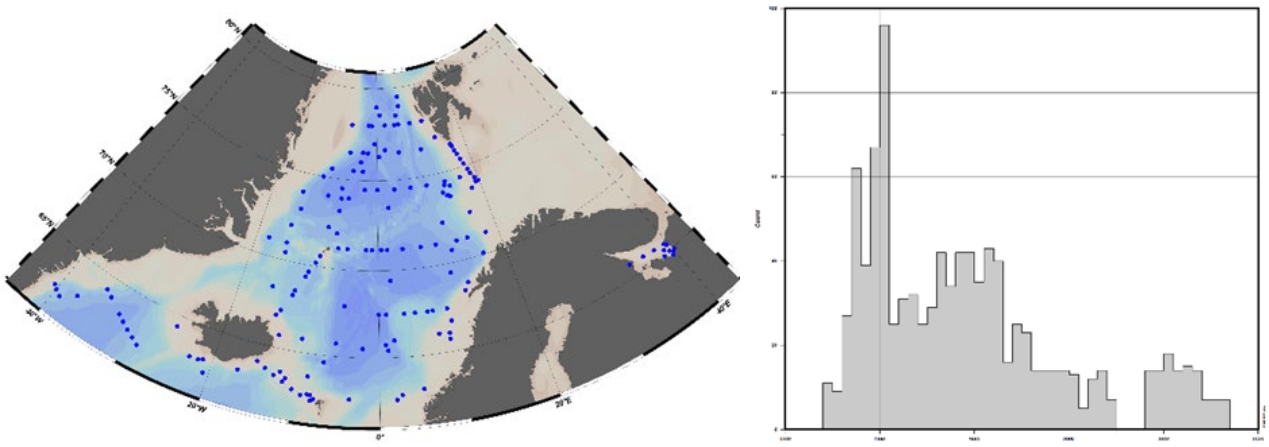


Figure 2. Spatial (left) and temporal (right) distribution of sediment (top) and water profiles.

Key issues

All eutrophication data from IMR was deactivated before the first harvest, and replaced with an updated version of the data from 1990–2017. A new quality-controlled version of data from the 1980s is not ready yet, and the 2025 Arctic eutrophication collection therefore contains less data than the 2023 version. Also some ARGO profiles that were kept in the first harvest were removed from the 2025 collection.

For many of the ARGO profiles, some of the parameters are not calibrated or validated yet, particularly for pH and chlorophyll-a. This gives a lower percentage of good data for those parameters than in earlier collections. The profiles were kept in the collection if at least one parameter had data with QF = 1; otherwise there would be almost no oxygen data after 2010.

All new and updated contaminants data in 2024 were sediment depth profiles; there was no new data in water or biota. Only one CDI partner delivered new or updated contaminants data for the Arctic region during the last 4 years.

Generating harmonised, aggregated and validated data collections in the Mediterranean – HCMR

In EMODnet Chemistry V project (phase II, 4/10/2023 to 3/10/2025) efforts focused first on improving the existing collections, and second on expanding them from the previous phase of the program. The improvements made related to the requirements of the users and the MSFD board of experts. The P35 parameter group was revised with the cooperation of BODC, new codes were added in the existing groups, new groups were created (POC, PON, DOC, and H2S), and calibrated data separated from uncalibrated data. In addition, new metadata was added that allows users to separate data according to their location in relation to the distance from land (open water stations and stations close to land less than 12 Nm). During this period two harvest procedures took place. The first harvest was during the first year of the project, when HCMR received the eutrophication–ocean acidification (February 2024) and contaminants (March 2024) datasets for the Mediterranean Sea from MARIS. The second harvest was during the second year, when HCMR received both the eutrophication and contaminant datasets from MARIS in December 2024. In the first harvest, the Regional Leaders of the six areas worked only with the new and updated datasets and they merged them with the data collections from the previous phases after finishing the QC procedure. In the second phase, the Regional Leaders worked with the whole datasets due to the revision of the P35 parameters and metadata changes.

	Final collection of previous phase I	1st Harvest		2nd Harvest
		New & Updated	Final Merged Collection	Final Collection
EMODnet partners (Tot. N.)	27	10	27	27
Originators (Tot. N.)	106	24	106	110
Countries (Tot. N.)	19	8	19	19
Timeseries (Tot. Stations)	13,849	32	13,880	13,707
Restricted Timeseries CDIs (%)	6.69%	0%	6.67%	6.85%
Vertical profiles (Tot. Stations)	245,021	22,659	253,282	264,569
Restricted profiles CDIs (%)	21.06%	22.77%	20.64%	21.89%

Table 1: Eutrophication data collection for the Mediterranean Sea.

	Final collection of previous phase I	1st Harvest		2nd Harvest
		New & Updated	Final Merged Collection	Final Collection
EMODnet partners (Tot. N.)	18	7	18	19
Originators (Tot. N.)	49	9	49	52
Countries (Tot. N.)	14	5	14	15
Timeseries (Tot. Stations)	6,909	-	6,902	6,748
Restricted Timeseries CDIs (%)	1.10%	-	1.10%	2.10%
Vertical profiles (Tot. Stations)	8,264	407	8,367	8,216
Restricted profiles CDIs (%)	37.49%	38.32%	36.82%	43.64%

Table 2: Contaminant data collection for the Mediterranean Sea.

Tables 1 and 2 provide the amount of data (restricted and unrestricted) included in the collections created for eutrophication and contaminants in the Mediterranean Sea. The first column contains the data from the previous phase of the project EMODnet V (phase I, 4/10/2021 to 3/10/2023) while the next column contains the data for the current phase, separated from the two different harvest procedures. More specifically, comparing the numbers from the previous work with the current work on the final collection, there was an increase of >19,500 stations in the profile datasets in the eutrophication collection. On the other hand, there was a decrease of around 350 stations in total for the time series collections (eutrophication and contaminant collections) and contaminant profiles, which was mainly due to changes in the original data by the providers. More specifically, there are providers who have merged their data, resulting in fewer stations being shown. Another cause of this decrease is that data providers made changes according to regional leader instruction through the validation loop of the project, without following the consistency of the updating procedure, resulting in these files not being imported correctly by ODV software and being deleted from the final collection.

Finally, it is noticed that while the existing data are increasingly being corrected in every phase of the project due to the validation loop, in parallel more data are being added from new originators, indicating that the EMODnet community is growing at every step of the project.

	Profiles			Time Series		
Parameter	**Total Nb values Phase I**	**Total Nb values Phase II**	**Growth range (%)**	**Total Nb values Phase I**	**Total Nb values Phase II**	**Growth range (%)**
DO	16,243,806	19,287,430	**18.74%**	939,401	1,001,378	**6.60%**
DO saturation	685,538	858,931	**25.29%**	77,812	77,812	**0.00%**
NO2	184,127	175,835	**-4.50%**	43,809	43,833	**0.05%**
NO3	412,098	389,239	**-5.55%**	43,921	43,945	**0.05%**
NO2 + NO3 Orig.	56,877	61,616	**8.33%**	16,098	16,284	**1.16%**
NH4	104,182	90,290	**-13.33%**	63,183	63,389	**0.33%**
PO4	238,216	227,893	**-4.33%**	64,187	64,397	**0.33%**
SiO2	221,197	211,023	**-4.60%**	54,353	54,540	**0.34%**
CHL-a	12,590,047	14,617,813	**16.11%**	547,612	724,800	**32.36%**
Total Phosphorus	14,052	17,681	**25.83%**	39,032	39,032	**0.00%**
Total Nitrogen	12,291	12,672	**3.10%**	8,689	8,689	**0.00%**
Total Alkalinity	10,603	13,285	**25.29%**	8,240	8,240	**0.00%**
pH	610,711	622,113	**1.87%**	465,567	533,955	**14.69%**
Dissolved Inorganic Nitrogen Orig.	43,026	21,395	**-50.27%**	227	251	**10.57%**
NO2 + NO3	459,893	440,734	**-4.17%**	49,872	50,082	**0.42%**
Dissolved Inorganic Nitrogen	110,814	96,348	**-13.05%**	49,805	50,011	**0.41%**

Table 3: Total number of observations from the QCed aggregated eutrophication–ocean acidification data collections (profiles and timeseries) for the Mediterranean Sea in Phase I and Phase II of EMODnet V.

Table 3 presents the number of observations for the main parameters of the eutrophication data collection as well as the variation in both timeseries and vertical profiles between the current phase and the previous phase of the project. The number of data for almost all parameters in the timeseries collection and around half of the parameters in the profile collection increased, with the largest increase for total phosphorus (~25%) in the vertical profiles and chlorophyll (~32%) in the timeseries. The number of data for four parameters (DO saturation, total phosphorus, total nitrogen, and total alkalinity) remained the same in the timeseries data collection. The decrease in the number of data for around half of the parameters in the profile collections can be explained by the changes made during the revision to the P35 codes and by the fact that some data were deleted due to incorrect changes by the data providers. Therefore, although there was an overall increase in number of stations in the eutrophication profiles, the total number of observations did not increase. It is likely that the new stations contained a different type of data than those that were deleted. In contrast, this did not occur in the timeseries data because the data providers merged the files, resulting in a reduction in the total number of stations but an increase in the total number of observations.

The Mediterranean is characterised by a sufficient spatial coverage for vertical profiles of eutrophication data, whereas timeseries eutrophication data are mainly coastal. The comparison between the old and the new eutrophication data in profiles (Figure 1, top) shows that the spatial coverage did not change much except for a small decrease in stations in the southern and central Mediterranean and mainly in the Gulf of Sintra. For the timeseries data (Figure 1, bottom), the spatial distribution increased due to the addition of stations on the coasts of the Balearic Islands and the southern coast of Spain near Gibraltar.

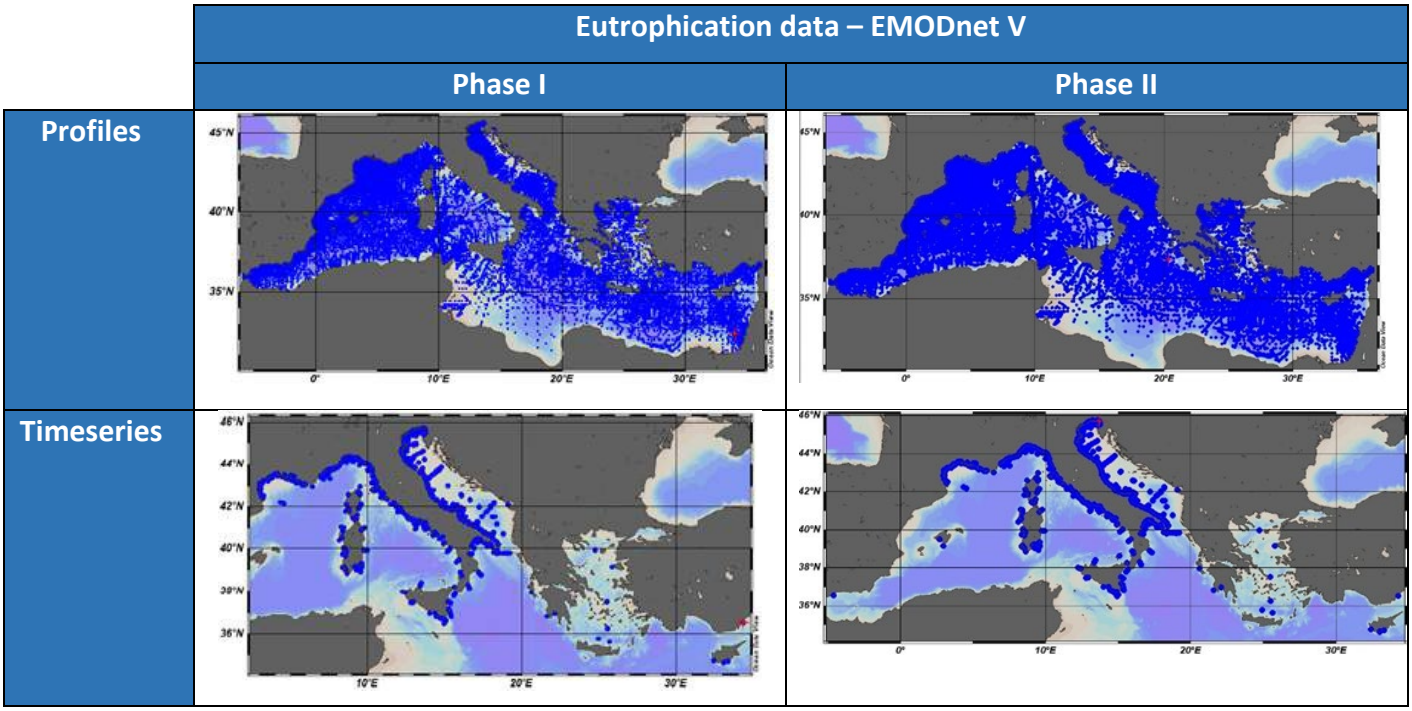


Figure 1: Spatial distribution of vertical profiles (top) and timeseries (bottom) of QCed aggregated eutrophication–ocean acidification data for the Mediterranean Sea during EMODnet V Phase I (left) and Phase II (right).

Figure 2 illustrates the spatial distribution of contaminant data as profiles (left) and timeseries (right) in all matrices (sediment, water and biota) during the current phase of the project. A comparison between the previous and present datasets reveals that the spatial distributions are is similar for sediment and water

timeseries collections. In contrast, all biota stations along the coast of Spain are new to the collection. An increase in the spatial coverage is observed in the sediment profile data, particularly along the coast of Spain. A similar increase is evident in the water profile data, especially in the Gulf of Lion and along the eastern coasts of Corsica and Sardinia. However, in the water profile collection, several stations along the coast of Israel were removed compared with the previous phase due to data quality issues. Similarly, all biota profile data for the Adriatic Sea were excluded due to errors.

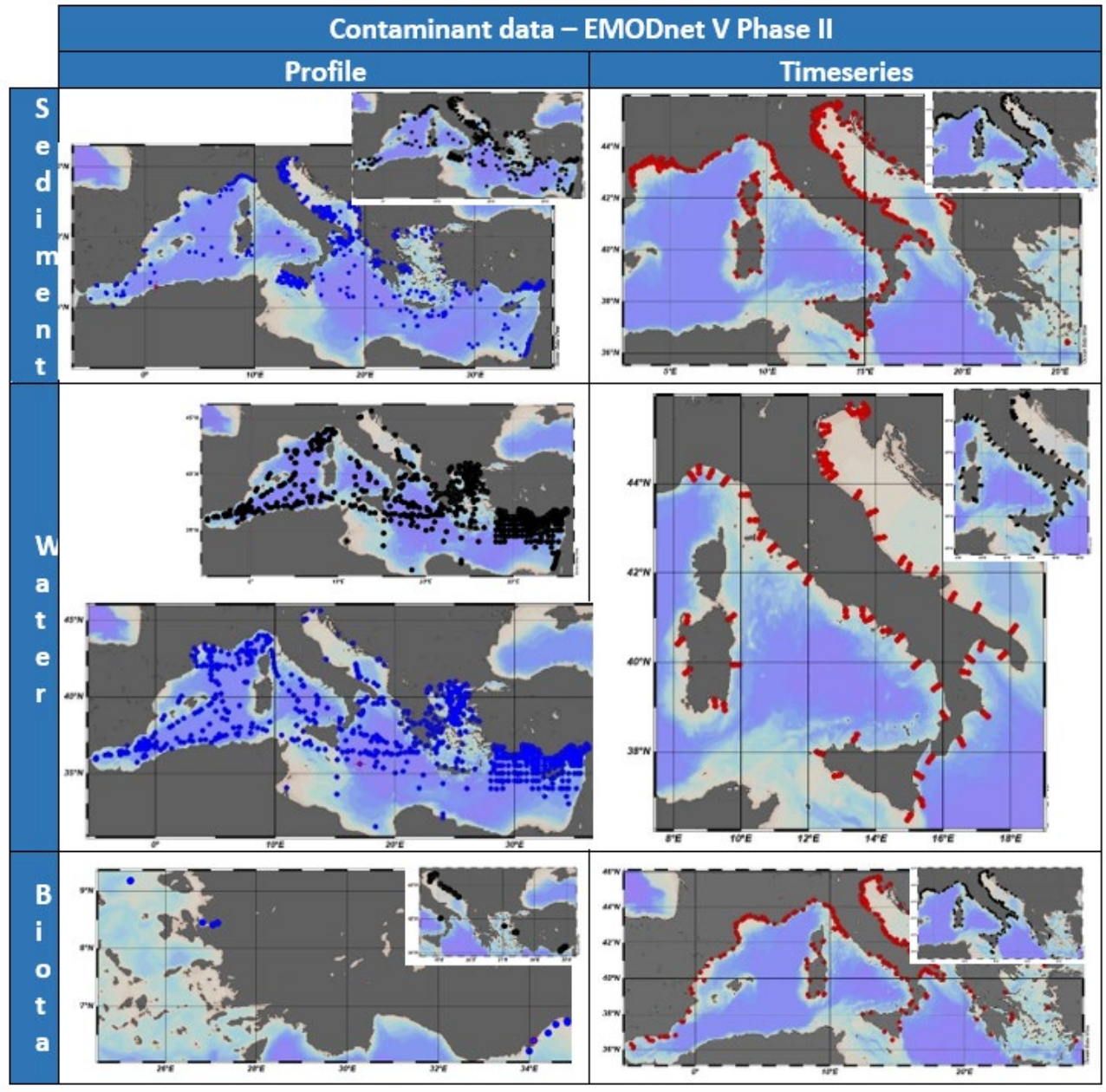


Figure 2: Spatial distribution of vertical profiles (left) and timeseries (right) of QCed harmonised contaminant collections for the Mediterranean Sea from EMODnet V Phase II in three matrices (sediment, water and biota). The smaller images (black dots) show the spatial distribution from EMODnet V Phase I.

Quality control

In each data harvest, the latest versions of ODV software and the common project procedure were used for the quality checks of measurements and aggregation/harmonisation at the regional scale.

The number and percentage of good/bad data in the QCed and aggregated Mediterranean eutrophication–ocean acidification profiles and timeseries collections are presented in Table 4. For most parameters, >80% of data are flagged as "good" (QF = 1, 2, 5, 6, 7, 8 and Q) both in profiles and timeseries datasets. The only parameters that have a lower percentage (approx. 66%) of "good" data is DO saturation in the profiles collection and chlorophyll-a in the timeseries collection.

It is noteworthy that there are very few total alkalinity data (<1%). This is because most of the data were from one data provider that used the wrong units of measurement, meaning that data were flagged as "bad" by the Regional Leader.

Considering that most data are now flagged as good and that the percentage of good data was lower for some parameters during Phase I, data quality seems to be improving due to the validation loop of the project.

	Profiles			Time Series		
Parameters	Total Nb values	Nb Good (%)	Nb Bad (%)	Total Nb values	Nb Good (%)	Nb Bad (%)
DO	19,287,430	17,591,171 **91.21%**	1,696,258 **8.79%**	1,001,378	897,425 **89.62%**	103,953 **10.38%**
DO saturation	858,931	569,175 **66.27%**	289,756 **33.73%**	77,812	68,084 **87.50%**	9,728 **12.50%**
NO2	175,835	161,686 **91.95%**	14,149 **8.05%**	43,833	42,003 **95.83%**	1,830 **4.17%**
NO3	389,239	344,991 **88.63%**	44,248 **11.37%**	43,945	41,682 **94.85%**	2,263 **5.15%**
NO2 + NO3 Original	61,616	60,920 **98.87%**	696 **1.13%**	16,284	16,018 **98.37%**	226 **1.39%**
NH4	90,290	88,955 **98.52%**	1,335 **1.48%**	63,389	62,156 **98.05%**	1,233 **1.95%**
PO4	227,893	225,895 **99.12%**	1,995 **0.88%**	64,397	61,791 **95.95%**	2,606 **4.05%**
SiO2	211,023	208,278 **98.70%**	2,745 **1.30%**	54,540	53,930 **98.88%**	610 **1.12%**
CHL-a	14,617,813	12,799,445 **87.56%**	1,818,368 **12.44%**	724,800	480,266 **66.26%**	244,534 **33.74%**
Total Phosphorus	17,681	16,964 **95.94%**	717 **4.06%**	39,032	38,795 **99.39%**	237 **0.61%**

Total Nitrogen	12,672	11,429 **90.19%**	1,243 **9.81%**	8,689	8,546 **98.35%**	143 **1.65%**
Total Alkalinity	13,285	12,823 **96.52%**	462 **3.48%**	8,240	57 **0.69%**	8,183 **99.31%**
pH	622,113	500,006 **80.37%**	122,107 **19.63%**	533,955	511,192 **95.74%**	22,763 **4.26%**
Dissolved Inorganic Nitrogen Original	21,395	21,355 **99.81%**	40 **0.19%**	251	251 **100%**	-
NO2 + NO3	440,734	393,060 **89.18%**	47,674 **10.82%**	50,082	47,568 **94.98%**	2,514 **5.02%**
Dissolved Inorganic Nitrogen	96,348	87,490 **90.81%**	8,858 **9.19%**	50,011	47,447 **94.87%**	2,564 **5.13%**
Dissolved Organic Carbon	12,410	12,329 **99.35%**	81 **0.65%**	194	194 **100%**	-
Particulate organic Carbon	19,933	19,824 **99.45%**	109 **0.55%**	-	-	-

Table 4: Percentage of data flagged as "Good" (QF = 1, 2, 5, 6, 7, 8, Q) and "Bad" (QF = 3, 4) in the QCed and aggregated eutrophication–acidification data collections for the Mediterranean Sea.

Key issues

First, the number of CDIs for eutrophication profiles increased compared with the previous phase of the project. These 19,500 new stations were added by both old and new data providers/originators, and some of them cover new areas in the Mediterranean Sea giving an improved spatial coverage in some areas.

Second, the reduction in the total number of CDIs in the eutrophication and contaminant collections (especially in the timeseries data) does not mean that the number of data has decreased. One of the reasons for this reduction is that some data providers have merged their data. This can be easily understood if we also compare the numbers of observations that show an increase.

Additionally, the stations seem to contain more "good" data, which may be due to the fact that data providers have begun to better understand data quality control processes, resulting in the new data they provide being more accurate. Also, the increase in "good" data may be due to the corrections of the existing CDIs through the validation loop of the project, which is a crucial step.

Moreover, all data quality issues that lead to the mentioned decreases have been sent to the data providers through the project validation loop. Upon receipt of corrections from the data providers, the data will be re-introduced into the collections and the total number of stations will increase.

Although the QC procedure (checking only the new and updated data) gave the Regional Leaders the opportunity to have better control over the data, performing the aggregation and harmonisation procedures on all data from scratch allowed them to revise the P35 groups. Through this revision, new P01 were added to the existing ones, uncalibrated data were separated from calibrated data, and new useful P35 codes were

created. This led to the creation of a more complete and properly structured final collection without any data loss due to different protocols and uses of new P01 parameters codes from various data providers.

Hence, the overall quantity and quality of Mediterranean data have improved and it is expected that they will improve further during the next phase of the project.

Generation of data products, including collections for the NE Atlantic and Caribbean region – IFREMER

The last year of contribution to this phase 5, IFREMER – the regional leader for NE Atlantic and Caribbean Sea, was focused on aggregation, harmonization, quality control and validation of data concerning eutrophication, ocean acidification and contaminants for the NE Atlantic Ocean and for the Caribbean Sea. On December 2024, IFREMER received by MARIS the harvested data related to eutrophication, ocean acidification and contaminants- new, updated and old CDIs, as zip files (containing ODV txt and metadata csv files). The NE Atlantic dataset extends from 24.5°N to 48°N and from 42°W to 0°W while the Caribbean dataset from 11°N to 20°N and from 70.5°W to 60°W. As decided inside the consortium, after a complete review of the vocabularies, the aggregation step and QC processes, a full QC work was done on the entire datasets (old+updated+new CDIs).

Eutrophication and ocean acidification dataset description

All datasets - new, updated and old, from the new harvesting are aggregated and quality controlled.

After file format errors/warnings, duplicates and QC checks, the QCed aggregated NE Atlantic dataset contains 49325 vertical profiles (with 30% of restricted data) and 556 unrestricted time series from 15 CDI-partners; while the Qced aggregated Caribbean dataset contains 175 vertical profiles and 93 time series from 4 CDI-partners. All Caribbean data are unrestricted. Further indicators can be found in Table 1 below.

	NE Atlantic		Caribbean Sea	
	Profiles	Timeseries	Profiles	Timeseries
CDI partners	15	2	4	1
Originators	108	7	6	1
Countries	13	2	4	1
Time period	1921-2024	1974-2024	1921-2021	2001-2023
CDIs	49325	556	175	93
Restricted data (%)	30	0	0	0

Table 1 - ***Total numbers of CDI partners, Originators, Countries, CDIs, Percentage of restricted data and time period of the final QCed aggregated data collections in the NE Atlantic and the Caribbean Sea.***

The spatio-temporal distribution of the QCed aggregated datasets is shown on Figure 1 for the NE Atlantic Ocean and on Figure 2 for the Caribbean Sea. The spatial distribution maps show a quite good data coverage in the NE Atlantic ocean while in the Caribbean Sea data are sparse. The latter come mainly from ARGO floats for vertical profiles and from the French coastal monitoring network for timeseries. They are very recent: apart from some historical data from the 1920's, they start from 2000's for timeseries and from the 2010's for vertical profiles.

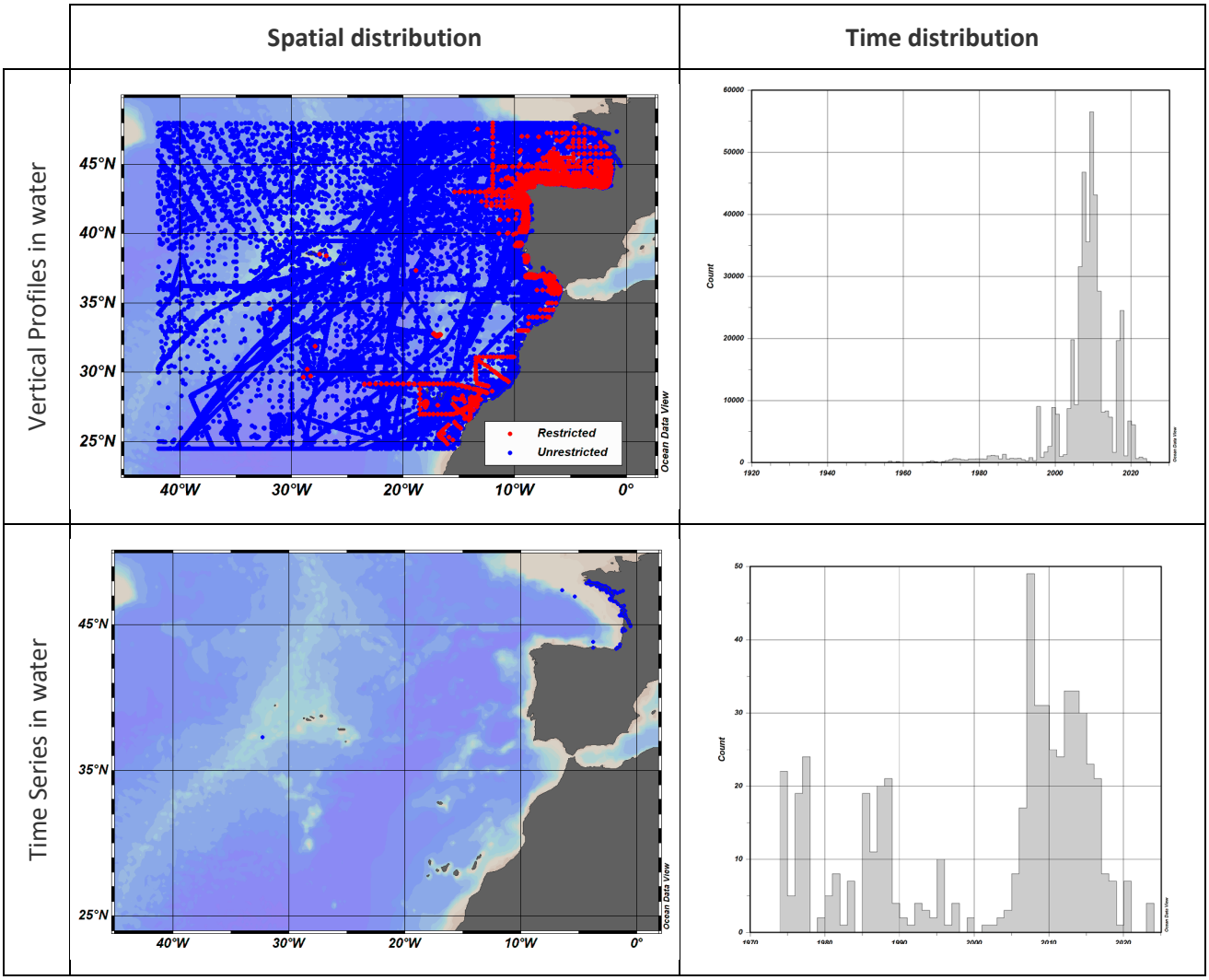


Figure 1 - Spatial (left) and temporal (right) distribution of CDIs/measurements for the vertical profiles (up) and time series (down) in the NE Atlantic Eutrophication & Ocean acidification dataset.

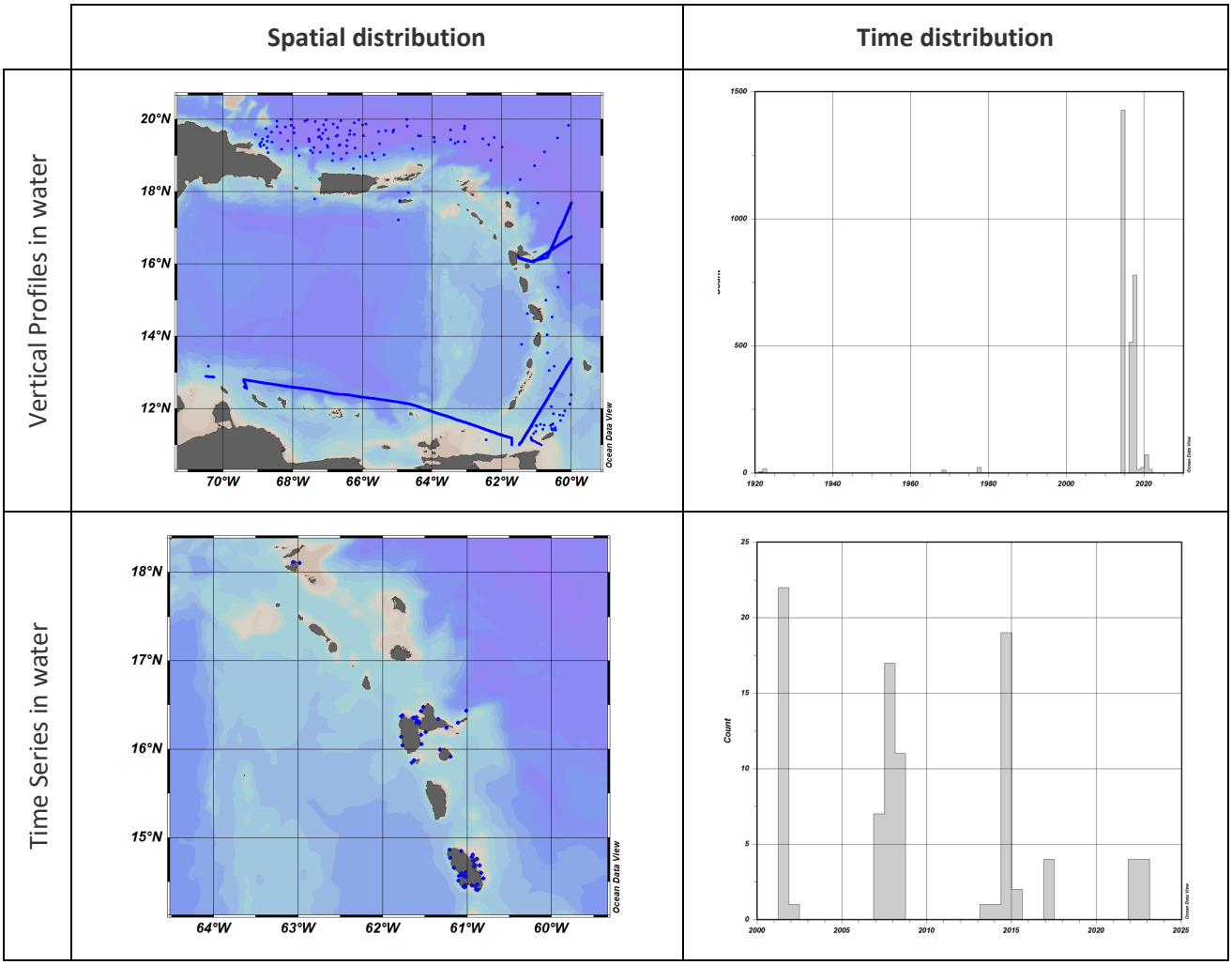


Figure 2 - Spatial (left) and temporal (right) distribution of CDIs/measurements for the vertical profiles (up) and time series (down) in the Caribbean Eutrophication & Ocean acidification dataset.

Quality control in eutrophication dataset

The ODV software v5.8.2 (developed by AWI) and the common project procedure were used for the quality checks of measurements and aggregation at regional scale (https://doi.org/10.13120/8xm0-5m67). The main QC steps were: apply P35 aggregation, check format/file errors (inconsistencies between ODV txt file and CDI, wrong P02 in CDI, wrong primary variable P01 in ODV txt file), check duplicates, check missing values encoding, check mixed P01 into P35 codes, check broad range, check for nutrients inorganic/total ratio for N and P, checks values under detection limit and zero values.

Thanks to the collaboration with CMEMS INSITU-TAC, broad range checks were refined in some regions for Oxygen and Chlorophyll-a data (https://doi.org/10.13155/54846) and additional QC steps were performed on DM/A/NRT ARGO profiles and using oxygen supersaturation thresholds. Thanks to a new metadata (Location qualification = “Beyond the 12 NM boundary” or “Landward side of the 12 NM boundary” or “Both (Landward + beyond the 12 NM boundary)”) differentiating “coastal” from “open sea” waters, broad ranges were only

applied to “open sea” waters. After more than a decade with the EMODnet experience, these broad ranges appear inappropriate for the high variability of coastal processes.

The number of measurements and the percentage of Good/Bad data of the QCed aggregated Eutrophication & Ocean acidification datasets are presented in Table 3 for NE Atlantic and in Table 4 for the Caribbean Sea.

The NE Atlantic profiles dataset has more than 96% of good data (QF=1, 2, 5, 6, 8 and Q) in average. Chlorophyll-a and PH data have the worst % of good data because of a higher number of data from uncalibrated instrument. The Time series dataset has more than 95% of good data in average.

P35 Parameters in NE Atlantic	Nb meas. Profiles	Nb meas. Time series	% Good (QF=1,2,5,6,8,Q) Profiles	% Good (QF=1,2,5,6,8,Q) Time series
dissolved oxygen concentration	11284897	142447	96,05	85,87
uncalibrated dissolved O2 concentration	210559	NS	99,55	NS
dissolved oxygen saturation	1134850	171180	99,58	78,36
nitrate	129277	NS	97,72	NS
nitrate plus nitrite_origin	33482	22897	98,39	99,98
nitrate plus nitrite	161432	NS	97,65	NS
nitrite	92153	NS	99,39	NS
ammonium	40307	35961	97,61	97,26
dissolved inorganic nitrogen (DIN)	39074	22330	96,54	99,84
urea	1163	NS	99,14	NS
phosphate	220187	35277	98,88	98,21
silciate	132046	29124	97,68	99,30
chlorophyll-a	3667367	37642	73,06	97,62
phaeopigments	3656	NS	99,70	NS
total alkalinity	8257	NS	98,63	NS
dissolved inorganic carbon	2094	NS	99,43	NS
pH	373716	18312	79,49	99,99
total nitrogen	1304	NS	99,39	NS
total phosphorus	880	NS	98,52	NS
particulate organic carbon {POC}	62033	NS	99,92	NS
dissolved organic carbon {DOC}	2398	NS	99,96	NS
particulate nitrogen	4110	NS	99,78	NS

Table 2 - Total number of measurements and % of Good/bad flagged data per P35 parameter for both vertical profiles and time series NE Atlantic collections after QC. NS stands for Not Sampled.

The Caribbean profiles dataset has around 89% of good data (QF=1, 2, 5, 6, 8 and Q) in average. Chlorophyll-a data have the worst % of good data because of a higher number of data from uncalibrated instrument. The Time series dataset has around 84% of good data in average.

P35 Parameters in Caribbean Sea	Nb meas. Profiles	Nb meas. Time series	% Good (QF=1,2,5,6,8,Q) Profiles	% Good (QF=1,2,5,6,8,Q) Time series
Dissolved oxygen concentration [umol/l]	38111	3004	99,97	90,18
Nitrate [umol/l]	14	NS	100,00	NS
Nitrate plus nitrite [umol/l]	14	2094	100,00	83,43
Nitrite [umol/l]	76	NS	100,00	NS
Ammonium [umol/l]	NS	3978	NS	79,81
Dissolved inorganic nitrogen (DIN) [umol/l]	NS	2088	NS	82,81
Phosphate [umol/l]	446	3967	80,27	81,83
Silicate [umol/l]	76	1155	100,00	83,72
Chlorophyll-a [mg/m^3]	3773	2538	31,30	88,49
pH [pH units]	302	NS	100,00	NS

Table 3 - Total number of measurements and % of Good/bad flagged data per P35 parameter for both vertical profiles and time series Caribbean collections after QC. NS stands for Not Sampled.

Contaminant dataset description

All datasets - new, updated and old, from the new harvesting are harmonized and quality controlled. After file format errors/warnings, duplicates, LOD/LOQ and zero/negative values checks, the QCed harmonized NE Atlantic dataset contains 3750 CDIs covering 3 matrices from 4 CDI-partners; while the Qced harmonized Caribbean dataset contains 54 CDIs covering 3 matrices from 4 CDI-partners. All Caribbean data are unrestricted. Further indicators can be found in Table 4 and **T**able 5 below.

Conta collections	Partners	Originators	Countries	Nb of CDI	%Restricted
Water profiles	3	4	3	2415	21
Sediment profiles	4	16	3	782	36
Biota time series	2	2	2	270	51
Sediment time series	2	2	2	283	55

Table 4 - Numbers of data providers and CDIs for Contaminants in the NE Atlantic.

Conta collections	Partners	Originators	Countries	Nb of CDI	%Restricted
Water profiles	1	1	1	34	0
Sediment profiles	2	2	2	6	0
Biota time series	1	1	1	14	0

Table 5 - Numbers of data providers and CDIs for Contaminants in the Caribbean Sea.

Key issues

Apart from one new partner, the format of the data files has become more understandable by the data providers. The common issues are wrong encoded missing values, wrong parameter mapping and wrong units that mainly come from partners that are not anymore inside the consortium. The duplicate check is still very time consuming and new criteria need to be tested to automate the decision to take on whether the data is a real or false duplicate. Outcomes from another European project - BlueCloud2026, may help to fasten this duplicates check's activity.