EMODnet Thematic Lot n°5 – EMODnet Chemistry

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Centralisation Phase

Work Package 5:

MSFD Board of Experts: Eutrophication

29 September 2025

Disclaimer

Document info

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MSFD Board of Experts: Eutrophication

1 Summary

The MSFD Board of Experts meeting, led by Neil Holdsworth (ICES) with key contributions from Alessandra Giorgetti (OGS), Martin Larsen (AU), and Charles Troupin (ULIEGE), focused on updates and improvements to EMODnet Chemistry's eutrophication data products, including discussions on data quality control, accessibility, and changes to products to better align with user needs. MSFD board highlighted both the enhanced usability of the new products and ongoing challenges with data coverage and product clarity.

Proposed future actions include evaluating a 10-year data product, engaging regional conventions with updated presentations of products, and reviewing the publication of error map layers on the portal to balance user needs and data transparency.

2 Introduction and summary

This board meeting walked-through the process for producing the data products, including QA steps used for the 2025 updates of the datasets and map products for **eutrophication**. Eutrophication[1], excessive nutrients in the sea, is generally associated with land-based human activity i.e. agriculture. Monitoring programmes across Europe routinely monitor and collect data on the concentration of nutrients, such as nitrates and phosphates, in support of national, regional sea convention and EU MSFD assessments and targets. EMODnet chemistry has a focus on data that support assessments of eutrophication, particularly related to the MSFD.

The MSFD Board of experts comprises over 50 participants from around 28 international research institutions, non-governmental organisations and regional, national and European government agencies. Each session has a thematic focus, this one on marine litter, and draws on the pool of experts in data management, research and governmental agency role to actively give input to ensure that EMODnet Chemistry is tuning its data management and data products to the needs of the user and to keep the experts informed on developments. To become a member, or to receive further information, please send an email with the subject 'Chemistry MSFD Board of experts' to info@emodnet-chemistry.eu.

The meeting was held online, with a total of **29 participants** from around Europe. EMODnet comprises a network of more than 120 organisations. For EMODnet Chemistry, this is the third in a series of 3 thematic MSFD board meetings, with marine contaminants and marine litter held earlier in the year.

3 Summary of EMODnet Chemistry (Alessandra Giorgetti, OGS)

The European Marine Observation and Data Network was initiated by DG MARE in 2009 and is currently developing a vision to 2035. It is financed by the European Union. EMODnet provides easy and free access to marine data, metadata, and data products from 7 different domains. EMODnet is implemented by a network of over 120 organisations working with European marine data infrastructures. Since January 2023, EMODnet has a single point of access for all 7 domains via the EMODnet portal. The EMODnet Chemistry network includes 42 organisations such as national oceanographic data centres, environmental monitoring agencies, and expert institutes. The network focuses on the collection, aggregation, standardisation, and quality control of EU marine water quality data relevant to EU Marine Directives and global climate change. EMODnet delivers standardised, harmonised, and validated data collections and reliable data products.

EMODnet Chemistry offers access to data and data products through a data discovery and access service, regional data collections, webODV Data Explorer and Extractor, and a Map Viewer service. The parameters examined by EMODnet include marine litter, ocean acidification, contaminants, and nutrients.

[1] Descriptors under the Marine Strategy Framework Directive - Environment

Annual releases of data collections and biennial updates of maps and data products are maintained. The current project phase is ending, with the sixth phase beginning soon and running until 2029. The next EMODnet Open Conference on 25–26 November will serve as a kick-off for the new phase, all participants were encouraged to register for updates.

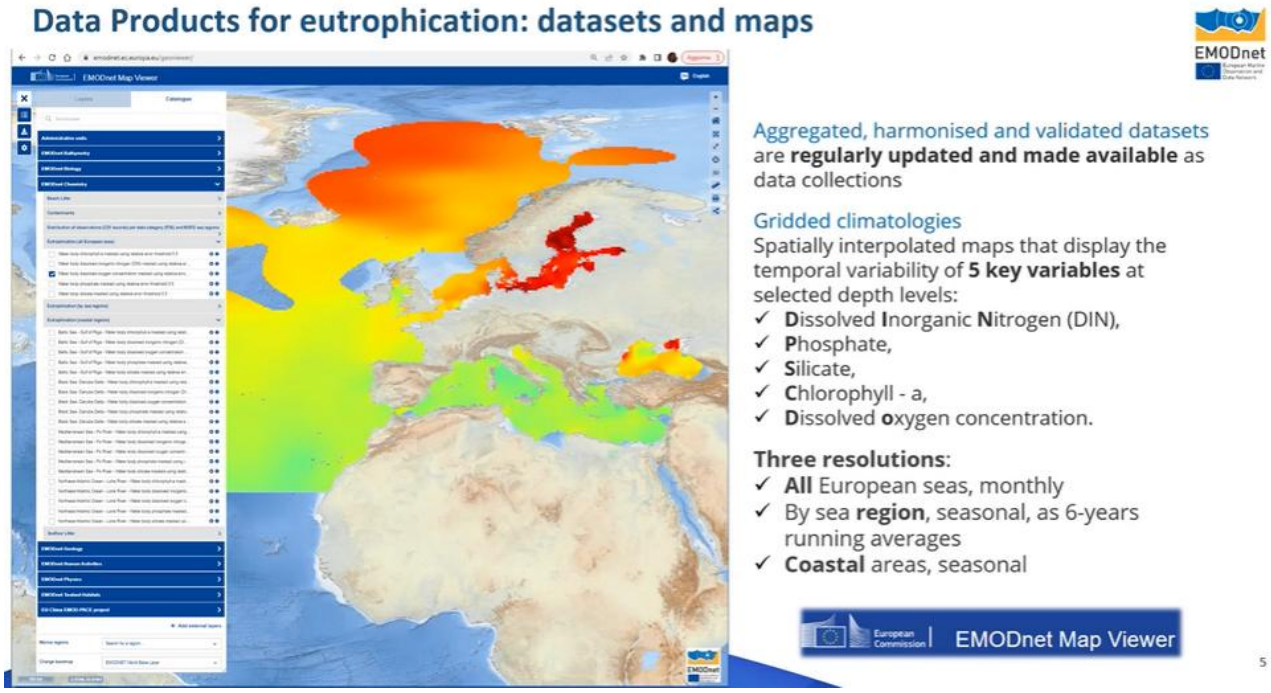


Figure 1 Overview of data products for eutrophication viewed through the central portal map viewer

4 Overview of data collection and Quality Control (QC) used for Eutrophication products (Martin Larsen, Aarhus University)

The quality control steps were briefly described which includes, checks for duplicates, incorrect variables, stations on land, and mismatches in codes and units. Supporting parameters such as temperature and salinity are checked by EMODnet Physics, while other parameters like turbidity and total suspended matter are reported if available.

New QC feature for **outlier detection**, the introduction of a location qualifier in the ODV software to distinguish between landward and open sea data has been added, improving outlier detection, especially for river mouths. Additional ancillary parameters and updated harmonisation codes were also implemented.

EMODnet Chemistry handles both open access and restricted data in its data collection. Restricted data require users to contact data suppliers for permission, though this is usually not problematic. For data products, permission is already secured, and restricted data are included in aggregated products without exposing individual data points.

5 New data collection and map products for Eutrophication (Charles Troupin, University of Liege)

An in-depth presentation on the methodology for generating gridded eutrophication products, focusing on the DIVAnd interpolation tool, data collection, quality control, and the structure and accessibility of the resulting products, highlights:

- **DivaND** (DIVA in N Dimensions) method, an open-source Julia-based tool for spatial interpolation of marine data, chosen for its high performance and suitability for large datasets. The method balances proximity to observations with smoothing to account for noise and data heterogeneity.

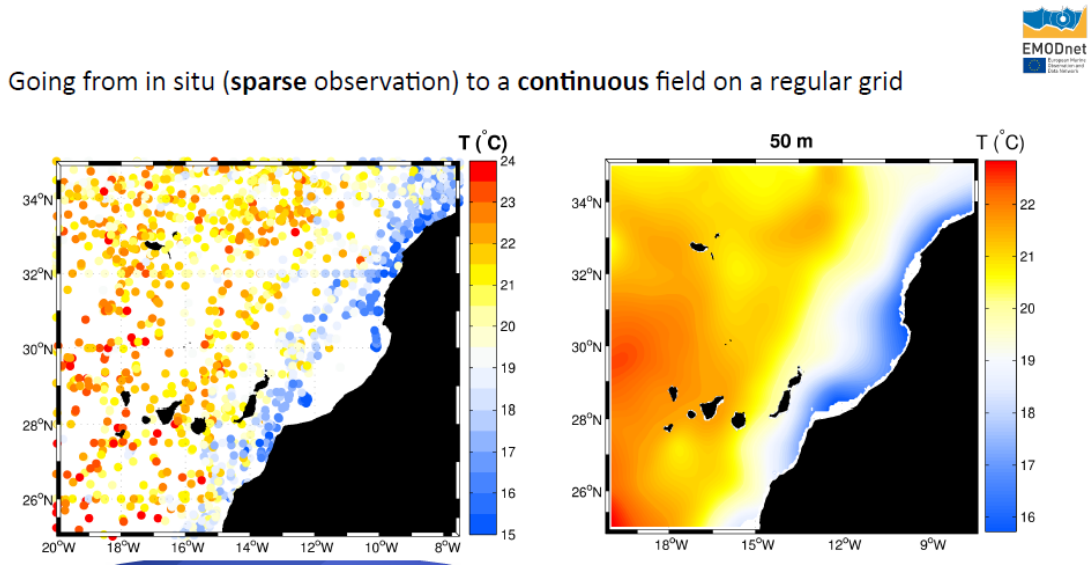


Figure 2 An example of how gridded interpolation is performed in DivaND

- The **interpolation** process requires high-resolution bathymetry and curated observation datasets. Quality control involves aggregation, vocabulary harmonisation, conversion of pressure to depth, and manual and automatic checks, with detailed documentation available.

- Products include monthly and seasonal **gridded maps at various resolutions** for European seas and coastal regions, covering variables such as ammonium, chlorophyll a, oxygen, nitrogen, phosphate, and silicate. Error fields are computed to indicate the reliability of interpolated values.

Figure 3 Silicate observations in the European seas available through EMODnet Chemistry

Users can access data collections and products via the EMODnet Central Portal, with options for direct download, visualisation through WebODV, and exploration using desktop tools. Metadata and observation identifiers are included for traceability. Product features and enhancements, such as error masking and high-resolution coastal products, are developed in response to user and MSFD expert board feedback, ensuring alignment with stakeholder needs.

6 Discussion

The MSFD board discussed user experiences, challenges in product accessibility, the potential for adjusting temporal windows for data products, and the importance of error fields, with input from the EMODnet Chemistry consortium guiding future actions.

Temporal Window for Products: EMODnet Chemistry raised the question of whether to maintain the current six-year moving window for regional products or consider extending it to ten years. The MSFD board supported offering both options to meet different assessment needs.

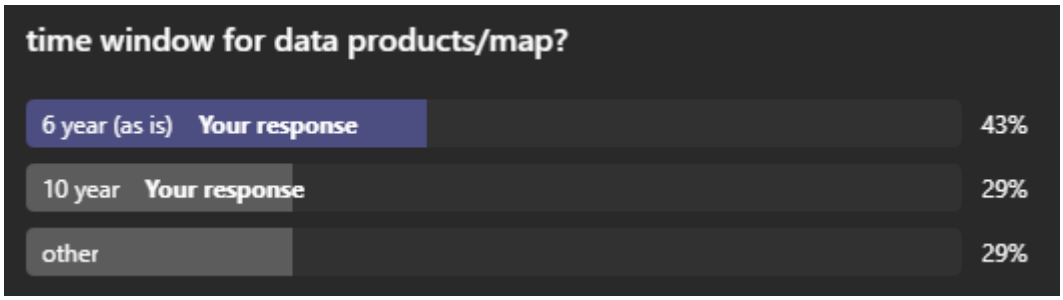


Figure 4 Participants poll on the time window for regional products

Error Fields and Transparency: The meeting discussed the value of publishing error maps alongside main products. The MSFD board emphasised their importance for assessment reliability, while EMODnet Chemistry clarified that error fields would remain available in downloadable files, even if not visualised by default on the EMODnet Central portal.

Regional Seas Convention Engagement: MSFD board members working with the regional sea conventions (RSC's) suggested presenting the improved products to OSPAR and HELCOM eutrophication groups to encourage uptake in regional assessments, with EMODnet Chemistry agreeing to follow up with relevant contacts.

EMODnet Chemistry highlighted the transition to the EMODnet Central Portal, noting efforts to reproduce and streamline products while seeking feedback on any issues with finding or using products after the migration.

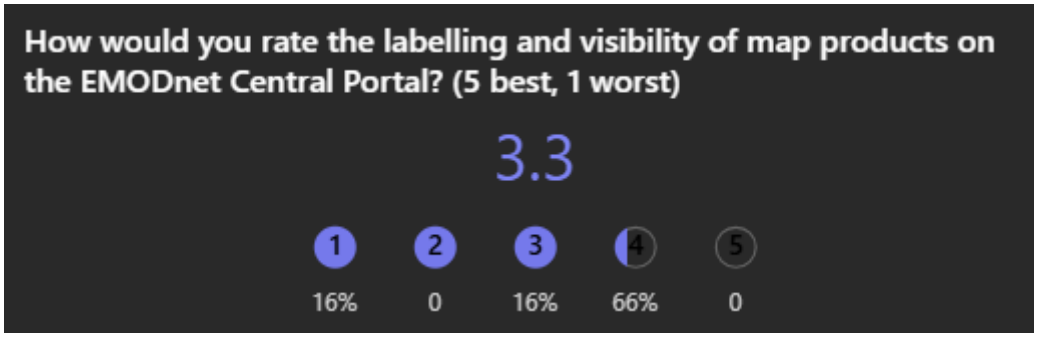
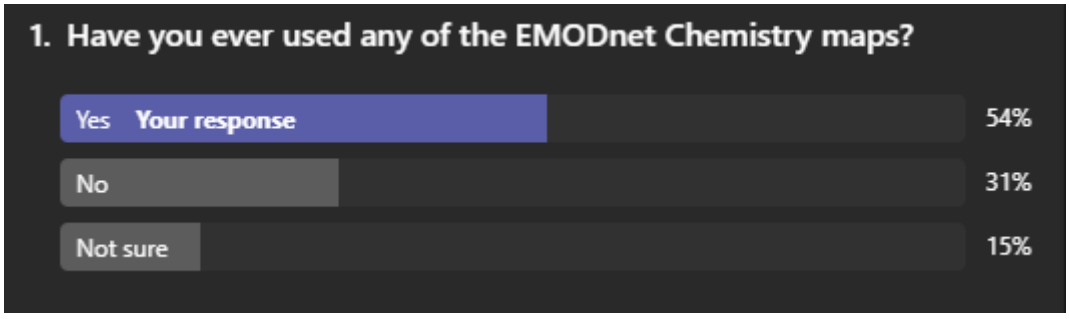


Figure 8 Participants poll on labelling and visibility of map products in the EMODnet Central Portal

In relation to the technical details of the dataset collection, EMODnet Chemistry clarified data points used in high-resolution coastal products can be extracted from the full data collection for a specific area or use observation IDs in the netCDF files to trace and retrieve the exact data points used in the DivaND analysis, though the files themselves do not contain the raw data due to license restrictions.

7 Inline polling results

Online polls were launched throughout the presentation to gauge understanding and knowledge of the maps and the EMODnet platform. For the inline polls where participants were asked to use a scale of 5 ticks to denote the value of a product, 1 tick indicates "not so useful" and 5 ticks indicates "very useful".



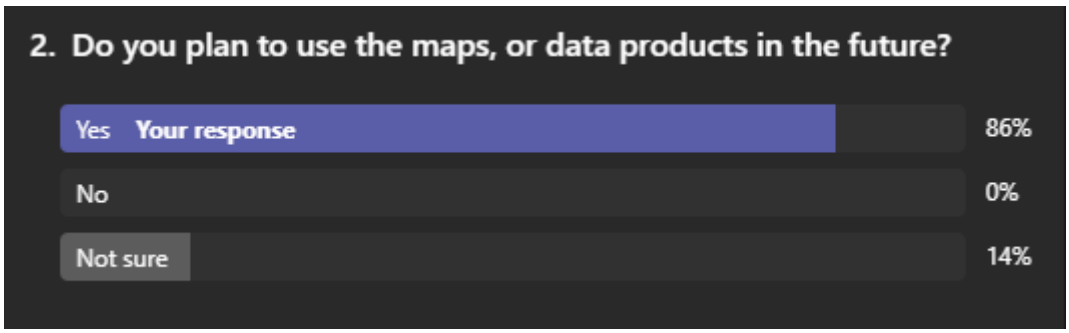


Figure 5 Participants poll on the current and future use of EMODnet Chemistry hosted data and products

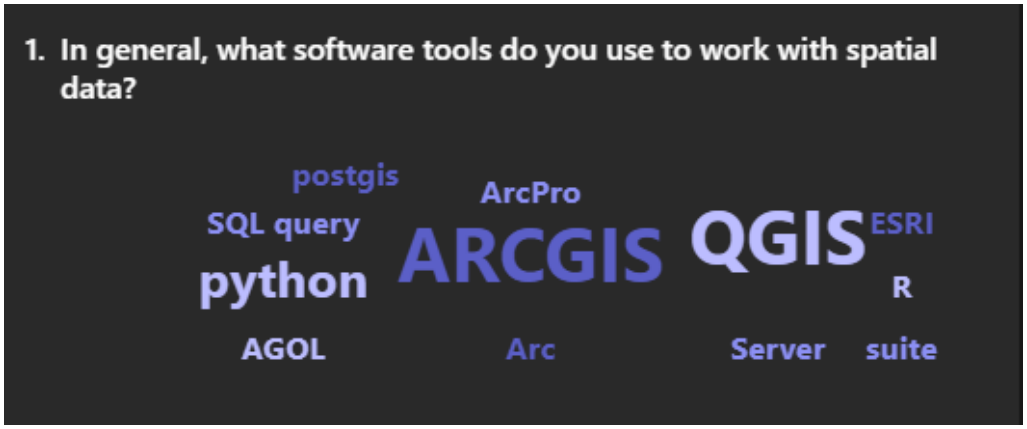


Figure 6 Participants poll on software used to produce spatial products from data

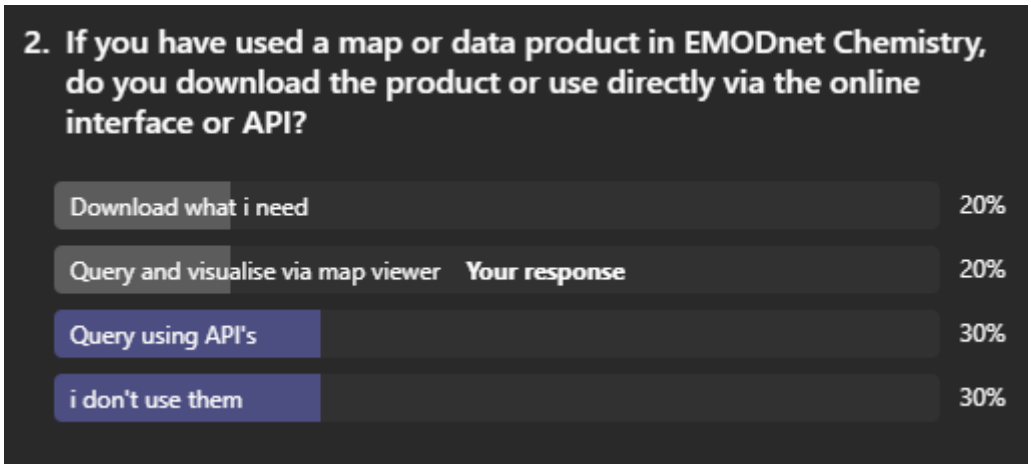


Figure 7 Participants poll on how experts access and query data in EMODnet Chemistry

8 Proposed actions for EMODnet Chemistry

10-Year Data Product for SDG and MSFD Alignment:
Evaluate the feasibility of producing a 10-year time window data product in addition to the current 6-year product to align with UN Sustainable Development Goals (SDG) and MSFD requirements, and discuss this with the EMODnet Chemistry steering committee.

Presentation to Regional Seas Conventions:
Arrange and deliver updated presentations or demonstrations of the latest eutrophication products to

OSPAR ICG Eutrophication and HELCOM EG Eutrophication groups, and follow up with relevant contacts in the other Regional Sea Conventions.

Error Map Layer Publication Review:
Review the necessity of publishing error map layers as separate visualisation products on the central portal, considering user feedback, and decide whether to retain or remove them while ensuring the data remain available in downloadable files.

9 Participants

Meeting title	MSFD Board for EMODnet Chemistry: Eutrophication
Attended participants	28
Average attendance time	1h 34m

Participants
Neil Holdsworth
Matteo Mikos
Lotta Fyrberg
Martin Mørk Larsen
Jelena Knezevic
Hans Mose Jensen
Alessandra Giorgetti
Sissy Iona
Luminita BUGA
Vasilis Kotinas
Østrem, Ann Kristin
Troupin Charles
Lotta Ruokanen
Julie Gatti (Ifremer)
Chiara Altobelli
Lise Cronne
Karin Wesslander
Michelle Guevara
SE Philip Axe
Maria Eugenia Molina Jack
Reiner Schlitzer
Luminita LAZAR
Andrew Conway
Jemmima Knight
Silvère André
Laura Brophy
Erol Cavus
Iryna Makarenko

10 Agenda

10:00 Welcome and Introduction, round table of new participants to the board (Neil Holdsworth, ICES)

10:10 Update on development of EMODnet Chemistry (Alessandra Giorgetti, OGS)

10:20 Overview of data collection and QC used for Eutrophication products (Martin Larsen, Aarhus University)

10:30 New data collection and map products for Eutrophication, including Q&A (Charles Troupin, University of Liege)

11:00 Inline polling (Neil Holdsworth, ICES)

11:10 Summary and conclusions (all participants)

11:25 Close of meeting