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Marine knowledge value chain: How the European Marine Observation and Data Network supports international marine policy against marine pollution.

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This contribution gives an overview of the European Marine Observation and Data Network (EMODnet) and focuses on the use cases of EMODnet managed data on marine pollution.

EMODnet has been funded by the European Commission for more than 15 years and is a trusted source for marine in-situ data and data products in Europe. It is a data infrastructure supporting data-intensive research and evidence-based policy making. Its data and products are accessible through a single entry point: the EMODnet portal at emodnet.ec.europa.eu. EMODnet is highly multidisciplinary and covers the entire marine environment for seven thematic areas: bathymetry, geology, physics, chemistry, biology, seabed habitats, and human activities. Over the years, each thematic consortium has succeeded in building a specific marine knowledge value chain. The starting point is a network of data providers who supply data to national data aggregators. They are responsible for aggregating and harmonising data and metadata to make them Findable, Accessible, Interoperable, Reusable, and reproducible (FAIR) according to European and global vocabularies and standards. Furthermore, EMODnet fosters international partnerships to support the interoperability of marine data in Europe and beyond.

The final link in this value chain is the extensive EMODnet user community, which includes national authorities and administrations, academia, non-governmental organisations and companies.

EMODnet Chemistry is the thematic consortium that supports the development of evidence-based knowledge on eutrophication, ocean acidification, and pollutants, including marine litter. Its work draws on the experience of a network of 66 organisations in 32 countries. Most are part of the UNESCO/IOC/IODE network of National Oceanographic Data Centres (NODCs) and a growing number have been officially recognised by the UNESCO-IODE Committee as accredited NODCs or are ISO-certified.

The EMODnet Chemistry value chain relies on SeaDataNet: the pan-European marine data management infrastructure with 110 organizations (NODCs, marine research institutes and international bodies) that has developed consolidated services, standards, and best practices. EMODnet Chemistry has harvested nearly 1.3 million metadata records and associated data from more than 500 different data providers.

EMODnet Chemistry has accumulated dozens of success stories across various types of data providers and users. For example, regarding data users, the European Environment Agency, the European Commission's Joint Research Centre, and most regional sea conventions in Europe have used EMODnet's chemical data to implement the European Union's marine framework policies. Researchers and Copernicus Marine Service use these data to develop tools, data products, and models for assessing environmental status and trends. Recently, partners in the Horizon Europe Blue Cloud 2026 project, which supports the implementation of the European Open Science Cloud, used EMODnet Chemistry data together with data from Copernicus Marine Service and the World Ocean Database (WOD). The goal is to develop a toolbox for creating customizable, validated datasets on key ocean variables of eutrophication and assessing the consistency of the information. Finally, EMODnet together with Copernicus Marine Service will form the data backbone for the European digital twin of the ocean.

Although EMODnet focuses on European data sources, it is increasingly contributing to global data systems, for example to share data on marine litter and ocean acidification.

Finally, a call to action: As recent European and global environmental reporting shows we can no longer ignore the transformative role of data for the UN sustainable development goals and disaster resilience. Now is the time for all countries to act quickly and collectively to strengthen the weakest link in the marine knowledge

value chain –from the local to the global level –so that evidence-based adaptation and mitigation measures can be defined and implemented to tackle the looming environmental crisis.

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