

European Marine Observation and Data network The marine data service for Chemistry

THE OCEAN RACE – THE GRAND FINALE
Genoa 27 June 2023

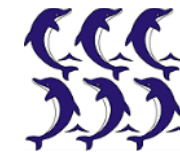
Alessandra Giorgetti, OGS Italy
with the contribution of Marina Lipizer
and Maria Eugenia Molina Jack

The network of marine institutes and environmental monitoring agencies

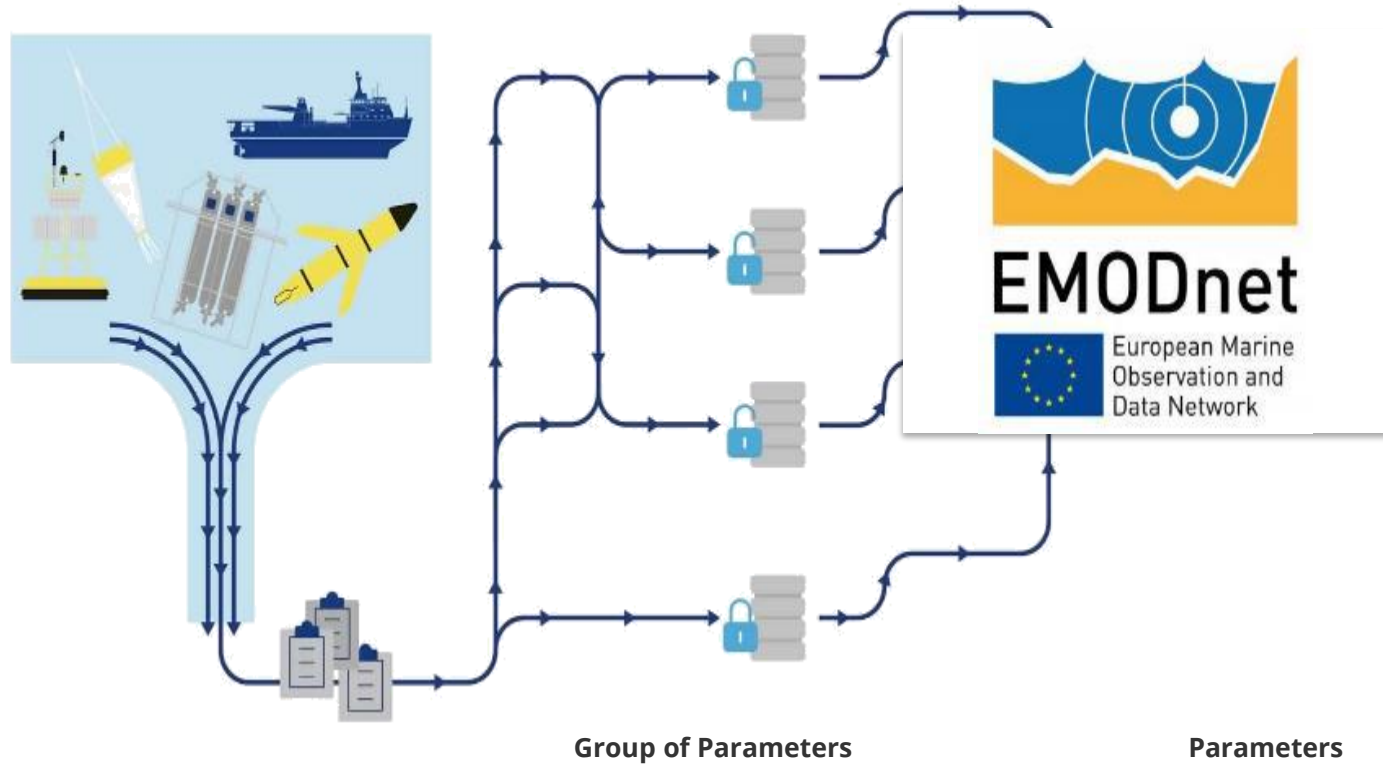


- **66** European centres
- **5** International organizations
- **500+** data providers
- **32** countries

European
Environment
Agency



From a lot of different sources of chemical data... to harmonized datasets



Marine debris washed up on a beach at Sharm el-Naga, Egypt



OSPAR commission website



Marine Litter	Beach macrolitter, Seafloor macrolitter, Floating microlitter	Composition, Abundance, etc.
Ocean acidification	Acidity	pH, PCO_2 , etc.
Contaminants	Antifoulants, Hydrocarbons, Heavy metals, Pesticides, Polychlorobiphenyls (PCBs), Radionuclides	Anthracene, Fluoranthene, Me, Cd, Pb, TBT, DDTs, etc.
Eutrophication	Nutrients, dissolved gases, etc.	N, P, Si, Chl-a, O_2 , C, etc.

Increased concentration of chemicals, such as nitrogen and phosphorus, in the coastal ocean promotes the growth of algal blooms, which can be toxic to wildlife and harmful to humans



La Repubblica, Dead zones of the Adriatic sea

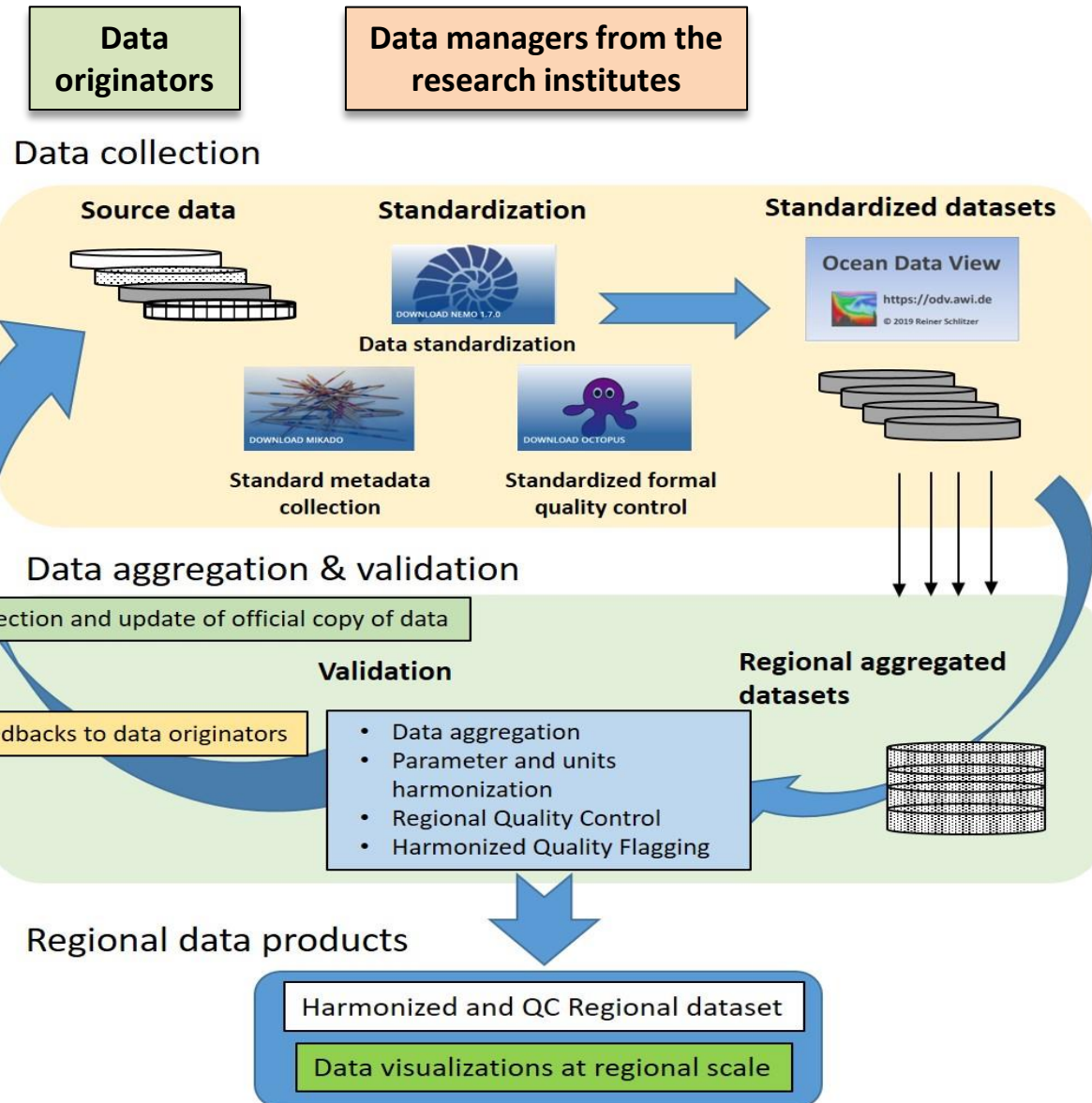
Main challenge is the high heterogeneity and complexity of data

- 14 groups of variables (e.g. fertilizers, heavy metals, hydrocarbons, pesticides, marine litter) containing multiple parameters,
 - Different measurement and laboratory methods, instruments etc.,
 - 3 matrices: water, sediment and biota,
 - Different temporal and spatial distributions,
 - Multiple EU organizations;
 - Heterogeneous data access policies.
-
- All European sea regions are covered.
 - **Data and metadata standards (EU based on ISO and OGC Standards).**



EMODnet Chemistry geographical coverage

EMODnet Chemistry data “Quality Control loop”: the value chain



frontiers in Marine Science

DATA REPORT
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Aggregated and Validated Datasets for the European Seas: The Contribution of EMODnet Chemistry

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OPEN ACCESS

INTRODUCTION

EMODnet (European Marine Observation and Data Network) is the long-term marine data initiative started by EU MSRD in 2009 as part of Blue Growth strategy (European Commission, 2012) to ensure that European marine data across across discipline-based themes become easily accessible, interoperable, and free of restrictions on use (Martín Míguez et al., 2019).

EMODnet Chemistry started in 2009 with a pilot phase aimed at testing the project feasibility in limited geographical areas on a restricted number of parameters (Vincic et al., 2013). The second phase, from 2013 to 2016, was aimed at expanding the spatial coverage and the range of chemical parameters (Vincic et al., 2016), while the third one, from 2017 to 2019, extended the data focus, including marine litter data and data products (Vincic et al., 2018).

The EMODnet Chemistry portal is now built on a network of 45 marine research and monitoring institutes and oceanographic data management experts from 27 countries. Many of these are National Oceanographic Data Centres (NODCs), actively involved in managing, indexing and providing access to ocean and marine data sets acquired from research cruises and monitoring activities in European marine waters and global oceans.

The objective of EMODnet Chemistry is to provide easy and open access to marine chemistry data sets and data products related to three main categories: water quality (e.g., nutrients, oxygen and chlorophyll), contaminants (e.g., hydrocarbons, pesticides, heavy metals, antifoulants) and marine litter (e.g., beach litter, sea litter and floating macro-litter). Data derive from inputs gathered and collated from national monitoring efforts and research activities from all European coastal states.

The large heterogeneity in data managed by EMODnet Chemistry derives from the different kinds of collected variables: water quality data are mainly available for the water column, whereas contaminants and marine litter are collected in the water, sediments and in biota. Furthermore, samples have been collected by a wide range of instruments used for in situ data acquisition, analyzed by heterogeneous laboratory protocols, with different method accuracy and precision that need to be described and archived, together with the data, to allow data reusability and solid scientific analysis. A lot of information included in metadata is therefore needed to correctly archive data and allow their long-term use. Historical data are often deprived of any detailed information on analytical procedures, calibrations and confidence intervals, coarsely.

Keywords: nutrients, oxygen, acidity, contaminants, sediment, biota, aggregated datasets

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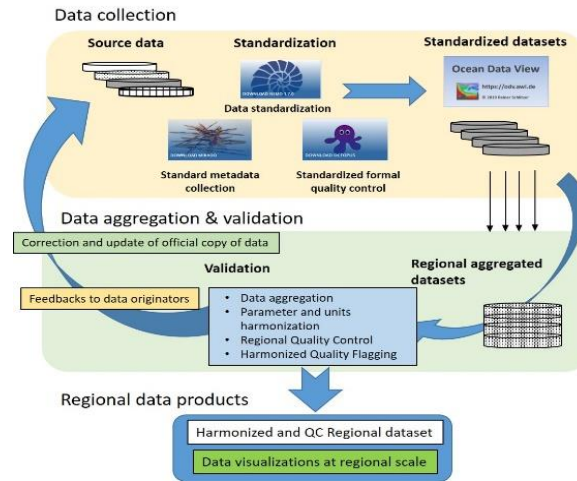
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Data products and analysis for environmental assessment

- Data curation



VERY IMPORTANT!

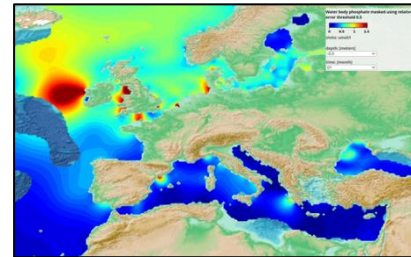
- Harmonized and validated datasets

North East Atlantic Ocean - Eutrophication and Acidity aggregated datasets 1921/2020 v2021

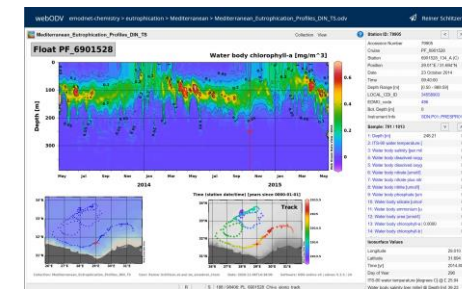
EMODnet Chemistry aims to provide access to marine chemistry data sets and derived data products concerning eutrophication, acidity and contaminants. The chemicals chosen reflect importance to the Marine Strategy Framework Directive (MSFD), ITS-90 water ...

Source: EMODnet Chemistry

- Data products at global scale



- Data exploration and analysis through online tools



How data products are used to answer societal challenges

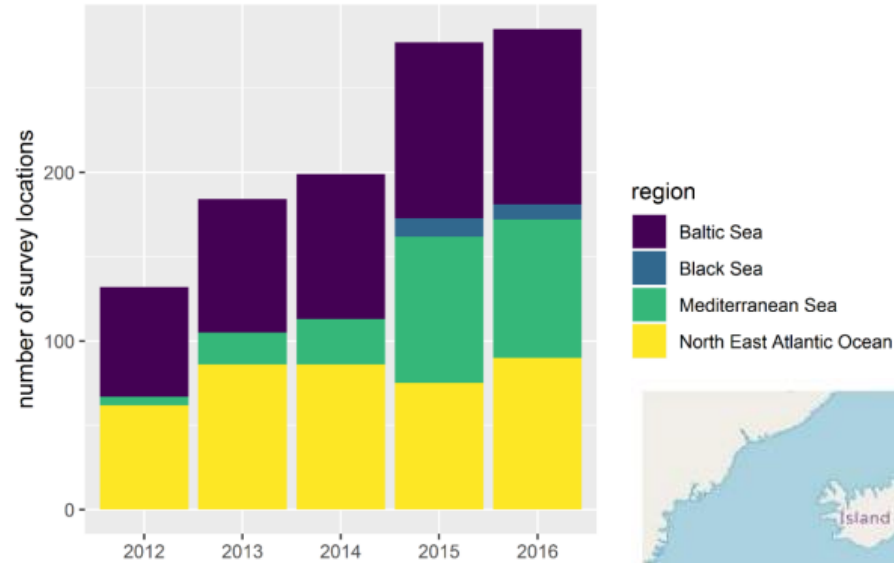
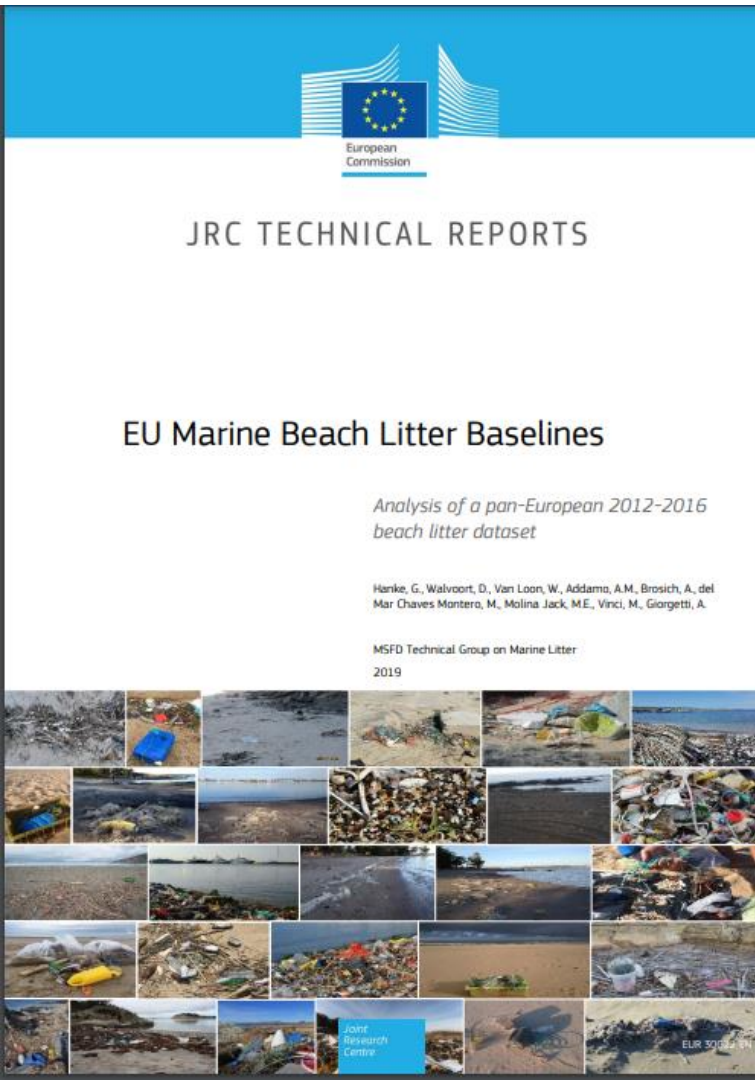


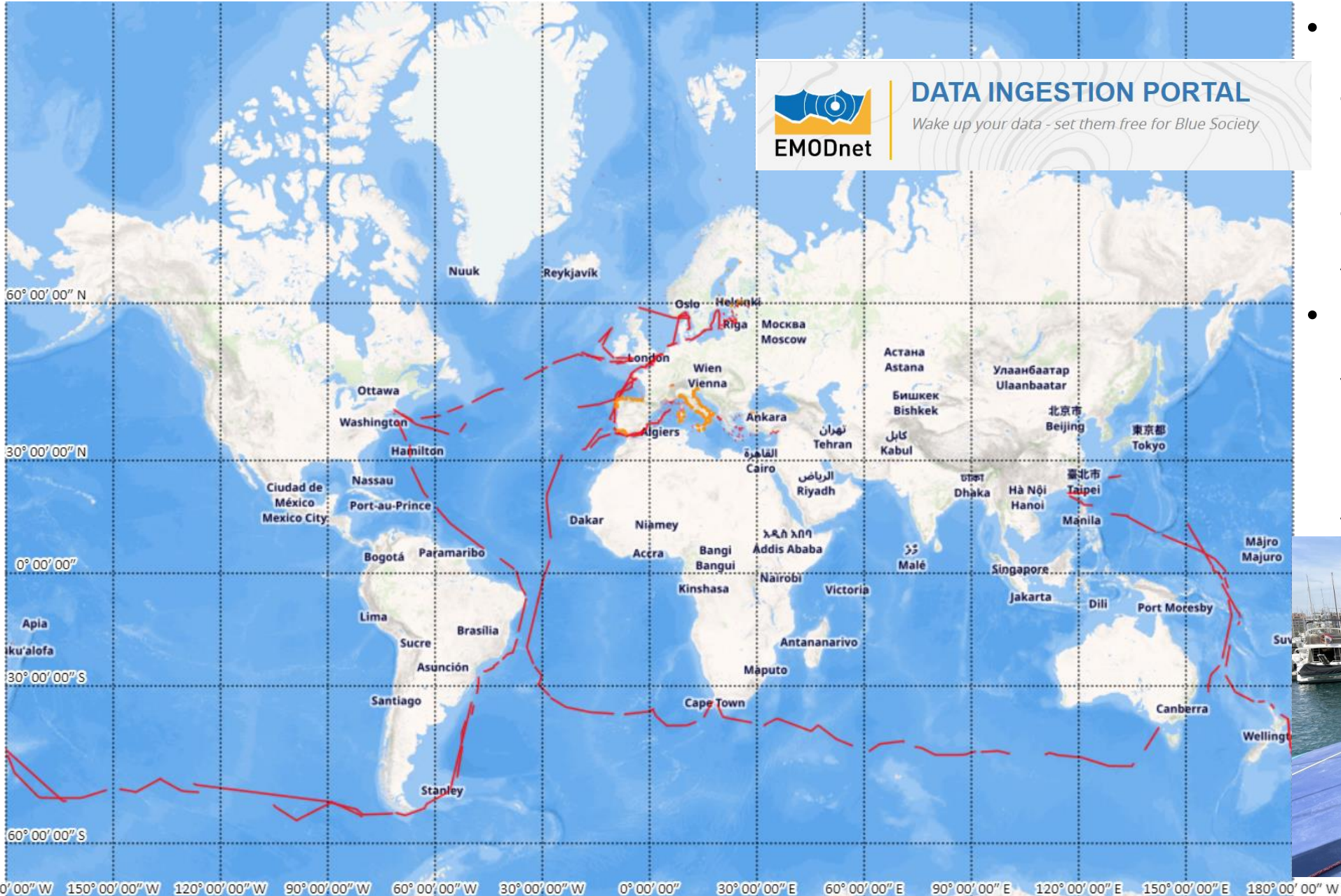
Figure 5: Number of surveys in different years per region

EMODnet Chemistry harmonized datasets for beach litter were used for the assessment of litter abundance, trends and distribution.



Figure 18: Map of mean beach litter abundances across the EU

Citizen science plays an important role: vessels of opportunity



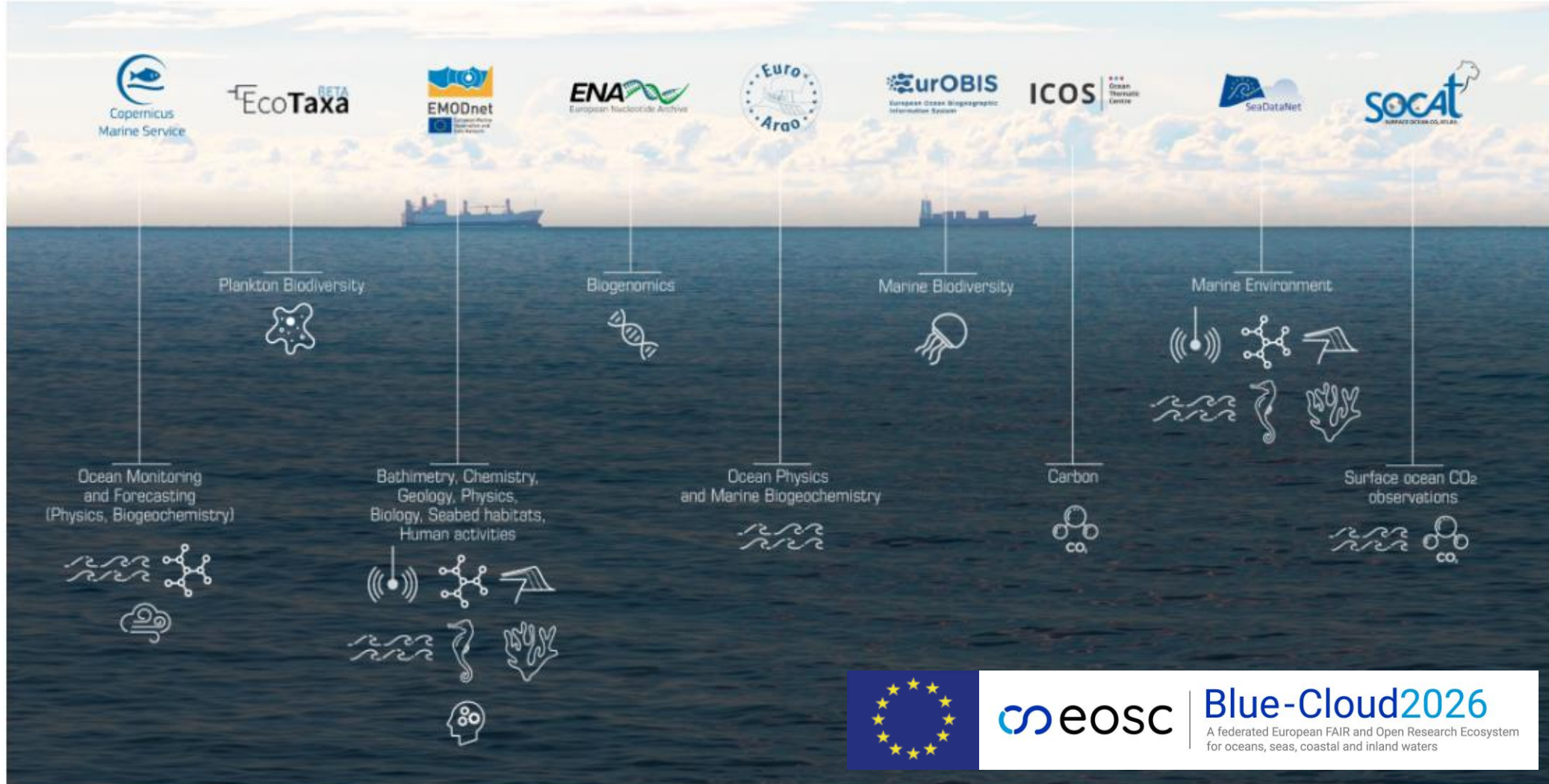
- Microplastic measurement from the Volvo Ocean Race **2017/2018** by GEOMAR Kiel (Turn the Tide on Plastic & AkzoNobel)
- Microplastic data generated during the Volvo Ocean Race in May-June **2021** (AmberSail2 and AkzoNobel)

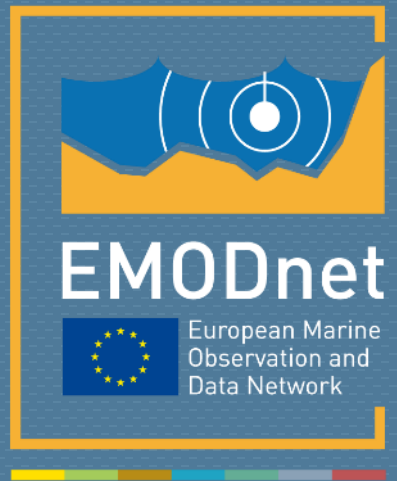


We are all connected: the European cloud-based knowledge system

Blue-Cloud 2026 federates the main Blue Data Infrastructures (incl. EMODnet), computing and analytical resources in **one collaborative platform** to undertake world-class research.

Every single laboratory sharing its data gives a contribution and can make a difference.





emodnet.ec.europa.eu

Your gateway to marine data in Europe





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