

EMODnet Ingestion and safe-keeping of marine data

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Access to marine data is a key issue for the EU Marine Strategy Framework Directive and the EU Marine Knowledge 2020 agenda and includes the **European Marine Observation and Data Network (EMODnet)** initiative. EMODnet aims at assembling European marine data, data products and metadata from diverse sources in a uniform way.

There is a wealth of marine data collected in Europe by public and private users, such as governmental organisations carrying out environmental monitoring, academic researchers studying the status of and fluctuations in the marine environment, private companies planning and building marine infrastructures, such as pipelines and wind farms, and even citizens science initiatives. In recent years, EMODnet has made huge progress in facilitating access to data from many sources. However, numerous data sets still remain hidden or unusable.

The **'EMODnet Ingestion and safe-keeping of marine data'** project, started mid-2016, tackles these problems by reaching out to data holders, explaining the benefits of sharing their data and offering a support service to assist them in releasing their data for subsequent processing, quality control, long term storage, and possible inclusion in EMODnet data products.

The activities are undertaken by a large European network that is geographically anchored in the countries bordering all European marine basins, and covers all EMODnet data themes. The EMODnet Data Ingestion ambassadors are representatives of national and regional marine and oceanographic data repositories and experts in marine data management. The network includes the coordinators of the EMODnet thematic projects. They work together in pan-European marine data management infrastructures such as SeaDataCloud, EurOBIS and EGDI, and in international organisations such as IODE, ICES, EuroGeoSurveys, EuroGOOS, and IHO.

Their activities are facilitated by the EMODnet Data Ingestion portal which encourages data providers to share marine data, gives marine data management guidance information, and provides a range of services such as:

- submission service for easy ingestion of marine data packages;
- view submissions service to oversee submitted data sets 'as is' and further elaborated as entries in major European marine data management infrastructures such as SeaDataNet, EurOBIS, and others which feed into EMODnet and CMEMS;
- data wanted service to post requests for specific data types.

Submission forms with data packages are assigned to qualified data centres from the EMODnet Ingestion network depending on the country of the data provider and the type of EMODnet theme.

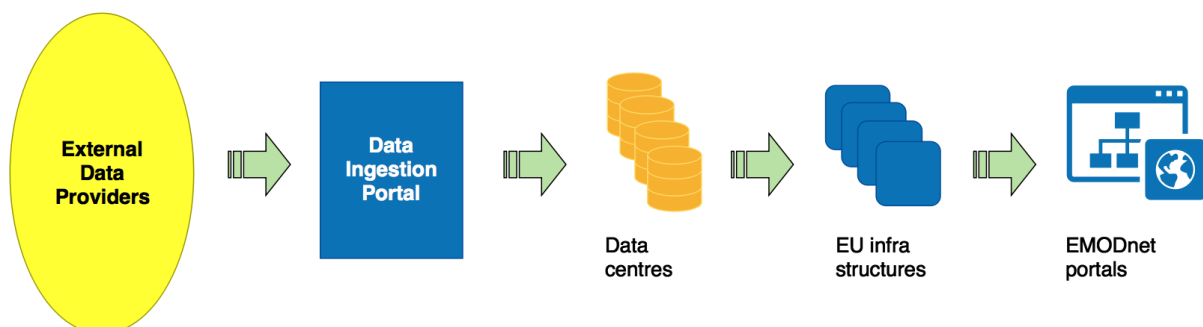


Figure 1: Flow of data sets from external data providers to EMODnet portals

After an initial period of developing the portal and services, followed by promoting and marketing to potential marine data holders, a steady inflow of submissions has been achieved. Currently, there have been more than 700 data packages submitted of which circa 600 have been completed and published "as-is". Of those, at present more than 250 submissions have been elaborated by assigned data centres to common formats and are made available by EMODnet thematic portals and as input for EMODnet data products.

Furthermore, a (semi-)automatic coupling was established between SEANOE and EMODnet Ingestion. SEANOE, operated by IFREMER, is a SeaDataNet service, inviting European scientists to publish their scientific papers and associated data collections in return for a DOI which will facilitate their wider citation. The coupling facilitates that (selected) scientific submissions from SEANOE are harvested by EMODnet Ingestion for further metadata completion, publishing 'as-is', and elaboration of data sets for inclusion and publishing in national, European and EMODnet portals.

EMODnet Ingestion not only concerns archived marine data sets, but also Near Real Time (NRT) and even Real Time (RT) operational oceanography data that are collected by fixed and moving platforms such as fixed stations, moorings, buoys, tide gauges, surface drifters, ferryboxes, argo floats, gliders, HF radars and other platforms. Together with EMODnet Physics, operators of operational oceanography networks and platforms are motivated and given guidance for making their datasets part of the European oceanography data exchange as managed by Copernicus CMEMS-INSTAC, EuroGOOS, and SeaDataNet, which are pillars under EMODnet Physics. In addition, EMODnet Ingestion and EMODnet Physics promote the uptake and adoption of Sensor Web Enablement (SWE) standards for operational oceanography data streams. Therefore, using the SeaDataNet SWE toolkit as developed by 52North, a SWE pilot has been set-up and is maintained. This pilot gives discovery and access to data streams from real time oceanographic monitoring systems, covering a range of operators and platforms, and allowing direct standardised access to selected data types from selected monitoring instruments.