

The Centralisation of EMODnet: the use of interoperable web services to unify a distributed spatial data infrastructure

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One central map viewer

to visualise all EMODnet data



1 OCEAN 1 EMODnet

One single portal

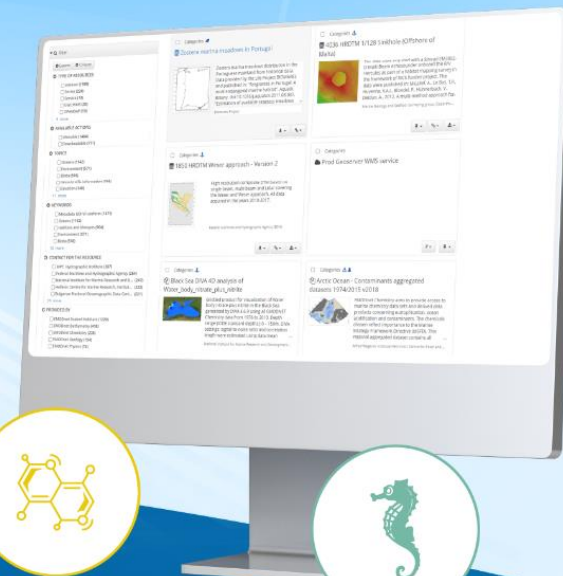
One central metadata catalogue

to enhance data search and discovery

140 partners

+100 use cases

Discover, visualise and download marine data and products across 7 thematics and hundreds of parameters



BATHYMETRY



HUMAN ACTIVITIES



PHYSICS



GEOLOGY



SEABED HABITATS



CHEMISTRY



BIOLOGY

EMODNET.EC.EUROPA.EU



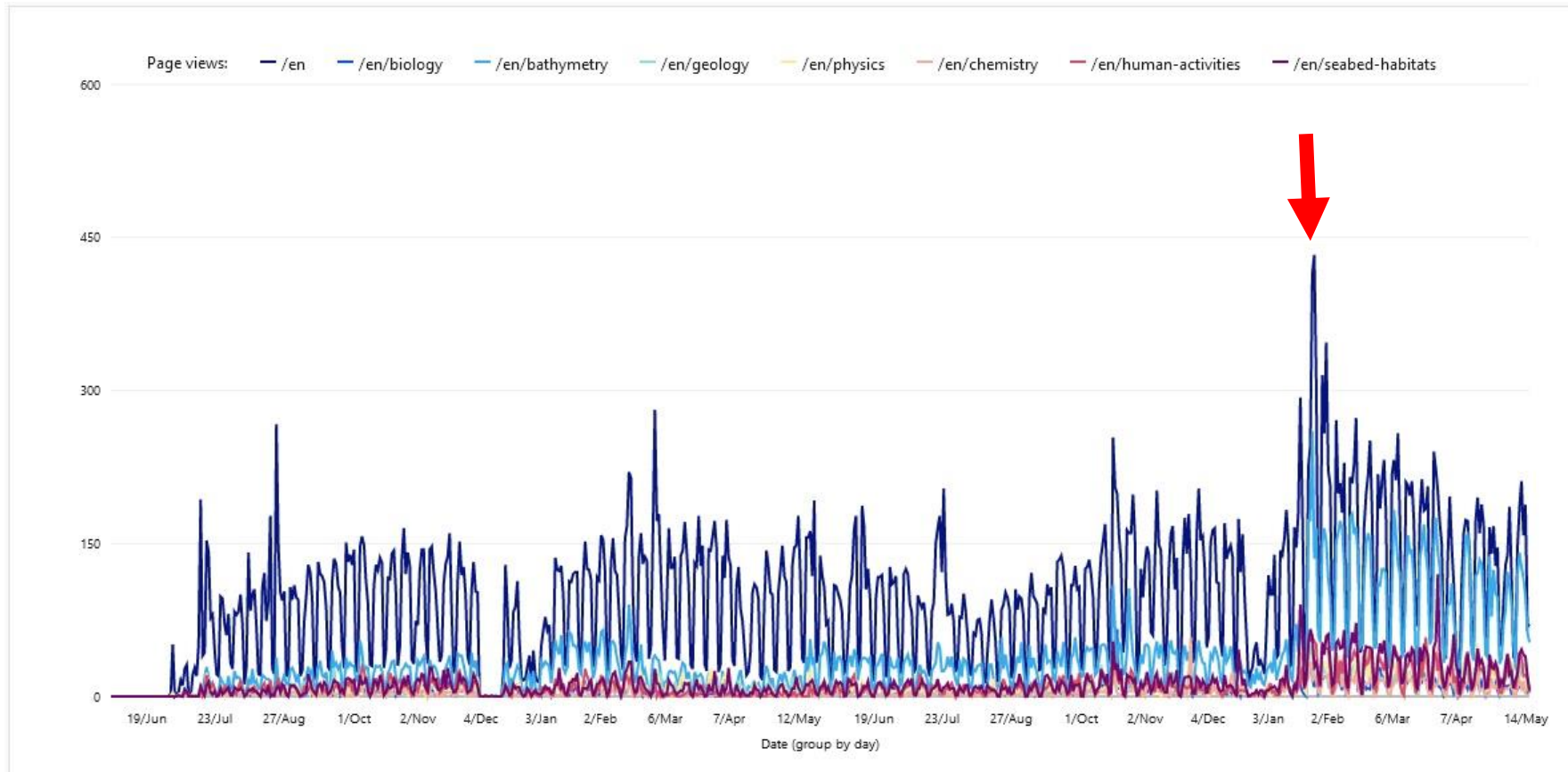
The European Marine Observation and Data Network (EMODnet) is financed by the European Union under regulation (EU) No 508/2014 of the European Parliament and of the Council of 15 May 2014 on the European Maritime and Fisheries Fund

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YOUR GATEWAY TO *IN SITU* MARINE DATA IN EUROPE AND BEYOND



EMODnet page views since repatriation in June 2021



- In November 2022 the unified EMODnet was switched on in ‘stealth mode’.
- In January 2023 the unified EMODnet officially switched on by getting the thematic portals to set up URL. redirects from their portals to their spaces on the new EMODnet portal.
- Also, the thematic portals set up URL redirects that mapped assets from their old portals to the new site.

EMODnet | One website – thematic pages – common information pages

Home > Themes > Chemistry

Chemistry

EMODnet Chemistry provides easy access to marine chemical data, standardised harmonized validated data collections and reliable data products, which are highly relevant to assessing ecosystem status according to the Marine Strategy Framework Directive, for all European marine regions.

Numerous substances are considered; most of them are invisible to the naked eye and can only be detected and tracked using special sensors or by laboratory analysis. This evidence-based information is essential for understanding seawater chemistry and its natural and/or human-induced variations. It is also essential for identifying and taking action against spatio-temporal environmental changes that pose risks to marine ecosystems and human health.

Access the Map Viewer >

Access the Products Catalogue >

Objectives

The first goal of EMODnet Chemistry is to collect and validate them freely available and interoperable. To this end, the part quality and large volume of observational datasets on seawater potential pollution.

Second, EMODnet Chemistry generates and publishes standard collections and reliable derived data products. These are all marine policies such as the Marine Strategy Framework Directive, Maritime Spatial Planning Directive. Specifically, EMODnet (chemical pollution), 9 (contaminants in seafood) and 10 (marine litter) [Cases](#).

MSFD Directive

EMODnet Chemistry focuses on four main themes:

- Eutrophication;
- Ocean acidification;
- Contaminants;
- Marine litter.

Currently, six major European sea regions are covered: the Baltic Sea, Northeast Atlantic Ocean (Celtic Sea, Iberian coast, Mediterranean Sea, Adriatic Sea, Aegean Sea, Black Sea).

Home > Data Services > Tools

Tools

A collection of tools, validators that you may find useful. Gathered in this section are applications and references that EMODnet data managers can also use. This page also has best practices, information and general guidelines on different types, found on EMODnet.

Access the Map Viewer >

EMODnet Technical Documents & Reports

[Technical reports](#)

[Biology data formats](#)

EMODnet Tools

Chemistry

- [Marine Litter Manager Tool](#), helps users to convert data formats by means of a Python tool.
- [EMODnet Beach Litter Format Validator](#), checks if the data format is correct and ready for data transfer.
- [EMODnet Seafloor Litter Format Validator](#), checks if the data format is correct and ready for data transfer.
- [Beach maps](#): Dynamic maps showing the Chemistry beach litter database.

Home > Data Services > Service documentation

Service documentation

Try out the EMODnet OGC web services in our R tutorial. View the tutorial here or run it interactively with Binder:

[launch binder](#)

Documentation

This document has links to all EMODnet web services that allow you to search, visualise and download EMODnet data and data products.

Metadata services

The EMODnet catalogues and other partner catalogues (IFREMER, etc.) offer the ability to search collections of metadata for data, services and related information objects related to the EMODnet Marine Data. The data catalogues offer a CSW endpoint to other client applications to connect to the service and query the metadata held in the catalogue.

| Portal | CSW GetCapabilities |
|----------------|---|
| Central portal | https://emodnet.ec.europa.eu/geonetwork/emodnet/eng/csw?service=CSW&request=GetCapabilities&VERSION=2.0.2 |
| Bathymetry | https://sextant.ifremer.fr/geonetwork/EMODNET_HYDROGRAPHY_PRODUCT_TILES/eng/csw?service=CSW&request=GetCapabilities&VERSION=2.0.2 |
| Biology | |
| Chemistry | https://sextant.ifremer.fr/geonetwork/EMODNET_Chemistry/eng/csw?service=CSW&request=GetCapabilities&VERSION=2.0.2 |
| Geology | https://drive.emodnet-geology.eu/geonetwork/srv/eng/csw?service=CSW&request=GetCapabilities&VERSION=2.0.2 |

EMODnet | One central catalogue – work in progress

EMODnet Product Catalogue

Search ...

Nothing in basket

Filter

- TYPE OF RESOURCES
 - Dataset (570)
 - Series (19)
- AVAILABLE ACTIONS
 - Viewable (453)
 - Downloadable (58)
- TOPICS
 - Environment (588)
 - Slicts (203)
 - Oceans (99)
 - Geoscientific information (25)
 - Imagery base maps earth cover (2)
- KEYWORDS
 - Environment (568)
 - Habitats and biotopes (538)
 - Metadata GDI-V-conform (528)
 - Marine habitat mapping (278)
 - Slicts (203)
- CONTACT FOR THE RESOURCE
 - Hellenic Centre for Marine Rese... (132)
 - Hellenic National Oceanographic... (131)
 - National Parks and Wildlife Service (79)
 - Joint Nature Conservation Commit... (58)
 - EMODnet Seabed Habitats (43)
- PROVIDED BY
 - EMODnet Seabed Habitats (564)
 - EMODnet Chemistry (19)
 - EMODnet Human Activities (8)
- YEARS
 - 2022 (5)
 - 2021 (15)
 - 2019 (16)
 - 2018 (10)
 - 2017 (27)
- FORMATS

Search results grid:

- North East Atlantic Ocean - Contaminants aggregated datasets 1970/2017 v2018
- North Sea - Contaminants aggregated datasets 1970/2017 v2018
- Black Sea - Contaminants aggregated datasets 1974/2017 v2018
- Baltic Sea - Contaminants aggregated datasets 1972/2017 v2018
- Mediterranean Sea - Contaminants aggregated datasets 1974/2017 v2018
- Habitat Map of "Capo Milazzo" marine protected area



EMODnet Product Catalogue

Search ...

Back to search

North Sea - Contaminants aggregated datasets 1959/2019 v2021

EMODnet Chemistry aims to provide access to marine chemistry data sets and derived data products concerning eutrophication, ocean acidification and contaminants. The chemicals chosen reflect importance to the Marine Strategy Framework Directive (MSFD). This regional aggregated dataset contains all unrestricted EMODnet Chemistry data on contaminants, and covers the North Sea with 34978 CDI records divided per matrices: 1460 biota, 24740 water profiles, 8090 sediment profiles and 201 sediment time series. For water, the temporal range is from 1959-10-03 to 2019-12-30. For sediment, the temporal range is from 1970-07-11 to 2019-12-18 for profile data and from 1993-09-16 to 2015-08-15 for the time series. For biota, the temporal range is from 1979-02-26 to 2018-02-28. Data were aggregated and quality controlled by Aarhus University, Department of Bioscience, Marine Ecology Roskilde from Denmark. Regional datasets concerning contaminants are automatically harvested. Parameter names in these datasets are based on P01, BODC Parameter Usage Vocabulary, which is available at: http://seadatanet.maris2.nl/bandit/browse_step.php. Each measurement value has a quality flag indicator. The resulting data collections for each Sea Basin are harmonised, and the collections are quality controlled by EMODnet Chemistry Regional Leaders using ODV Software and following a common methodology for all Sea Regions. Harmonisation means that: (1) unit conversion is carried out to express contaminant concentrations with a limited set of measurement units (according to EU directives 2013/39/UE, Comm. Dec. EU 2017/848) and (2) merging of variables described by different "local names", but corresponding exactly to the same concepts in BODC P01 vocabulary. Detailed documentation is available at: <https://doi.org/10.8092/8b52e8d7-dc02-4305-9337-7634a5cae3f4> Explore and extract data at: <https://emodnet-chemistry.webodv.awi.de/contaminants%3ENorthSea> The harmonised dataset can also be downloaded as ODV spreadsheet (TXT file), which is composed of metadata header followed by tab separated values. This worksheet can be imported to ODV Software for visualisation (More information can be found at: <https://www.seadatanet.org/Software/ODV>). The same dataset is offered also as XLSX file in a long/vertical format, in which each P01 measurement is a record line. Additionally, there are a series of columns that split P01 terms in subcomponents (measure, substance, CAS number, matrix...). This transposed format is more adapted to worksheet applications users (e.g. LibreOffice Calc). The original datasets can be searched and downloaded from EMODnet Chemistry Download Service: <https://emodnet-chemistry.maris.nl/search>

Distribution format: **zipped file (ODV spreadsheet and transposed spreadsheet) (Version: 1.0)**

Distributor

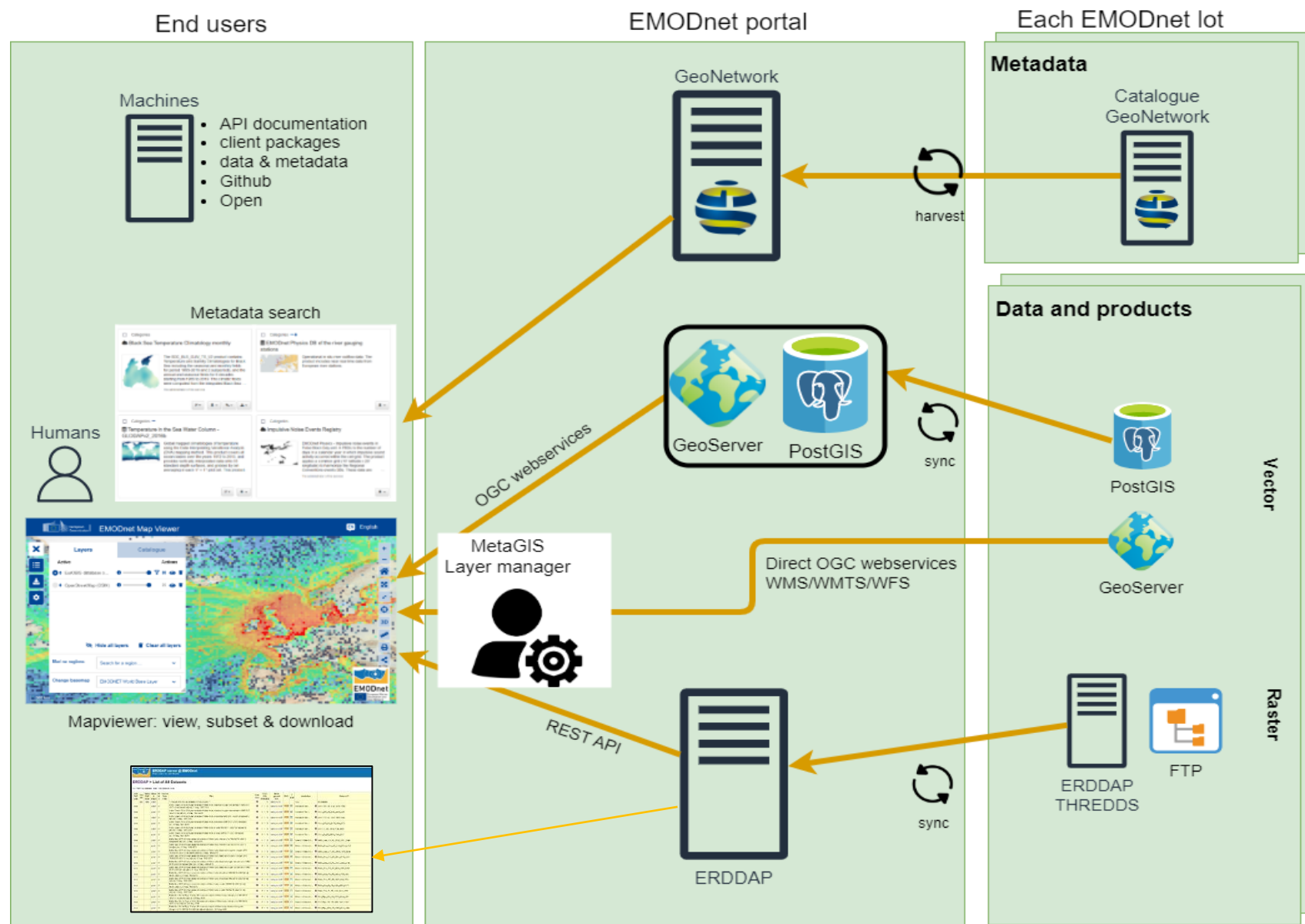
| | |
|-------------------------|---|
| Organisation name | National Institute of Oceanography and Applied Geophysics - OGS, Division of Oceanography |
| Delivery point | Borgo Grotta Gigante 42/c |
| City | Sgonico (Trieste) |
| Postal code | 34010 |
| Country | Italy |
| Electronic mail address | nodc@ogs.trieste.it |
| Linkage | http://www.ogs.trieste.it/ |
| Role | Distributor: Party who distributes the resource |

Overviews

- Water
- Sediment timeseries
- Sediment profiles
- Biota

A single GeoNetwork catalogue that harvest OGC CSW published by thematic groups

EMODnet | Technical Architecture



EMODnet | One map viewer – subset and download – webservice example

ERDDAP server @ EMODnet
Easier access to scientific data

ERDDAP > Search

Do a Full Text Search for Datasets:

24 matching datasets, with the most relevant ones listed first.
(Or refine this search with Advanced Search)

| Grid Data set | Table Data | Make Data | W A S | Source Data Files |
|---------------|------------|-----------|-------|---|
| | graph | files | | EMODNET Bathymetry DTM 2020 full |
| | data | files | | EMODNET Digital Bathymetry (DTM 2018) - F |
| | data | graph | | EMODNET Digital Bathymetry (DTM 2018) - F |
| | data | graph | | EMODNET Digital Bathymetry (DTM 2020) - F |
| | data | graph | | EMODNET Digital Bathymetry (DTM 2020) - F |
| | data | graph | M | The EMODnet Grid |

ERDDAP > griddap > Make A Graph

Dataset Title: **EMODNET Bathymetry DTM 2020 full**

Institution: VLIZ (Dataset ID: dtm_2020_v2_e0bf_e7e4_5b8f)

Information: Summary | License | FGDC | ISO 19115 | Metadata | Background | Data Access Form | Files

Graph Type: surface
X Axis: longitude
Y Axis: latitude
Color: elevation

Dimensions
Start latitude (degrees_north): 15.000520833333335
Stop latitude (degrees_north): 89.99947916665815
Start longitude (degrees_east): -35.99947916666667
Stop longitude (degrees_east): 42.999479166657686

Graph Settings
Color Bar: Minimum: Maximum: Scale: N Sections:
Draw land mask: Ascending

Redraw the Graph (Please be patient. It may take a while to get the data.)

Optional:
Then set the File Type: .nc (File Type information)
and Download the Data or an Image
or view the URL: https://erddap.emodnet.eur/erddap/griddap/dtm_2020_v2_e0bf_e7e4_5b8f
(Documentation / Bypass this form)

The DTM displayed is from an OGC web service

EMODnet Map Viewer

Layers Catalogue

Administrative units

EMODnet Bathymetry

Coastlines

Data quality

Depth

- Bathymetric contours
- Mean depth in multi colour (no land)
- Mean depth natural colour (with land)
- Mean depth rainbow colour (no land)
- High Resolution bathymetry

DTM Tiles

- Tile structure and download

Product selection:

| Layer | Format |
|--------------------------------------|-------------------------|
| Mean depth in multi colour (no land) | nc x x x |
| OpenStreetMap (OSM) | No data on the server x |

EMODnet
European Marine Observation and Data Network

The geo viewer sends messages (Restful API) to ERDDAP to get the DTM for the area of interest

EMODnet | One map viewer – subset and download – example 2

The screenshot displays the EMODnet Map Viewer interface. The main map shows a geographical area with a black rectangle highlighting a specific region. A legend on the left lists observation counts per grid cell, ranging from 1 to over 60,000. A 'Filter layers' dialog box is open, showing a predefined filter for 'Orcinus orca'. A 'Product selection' panel on the right shows the selected layer 'EurOBIS database observations' in 'csv' format. A 'Select your area' dialog box is also visible, showing a 'RecordCount' of 1. The interface includes navigation tools, a scale bar, and a language selector (English).

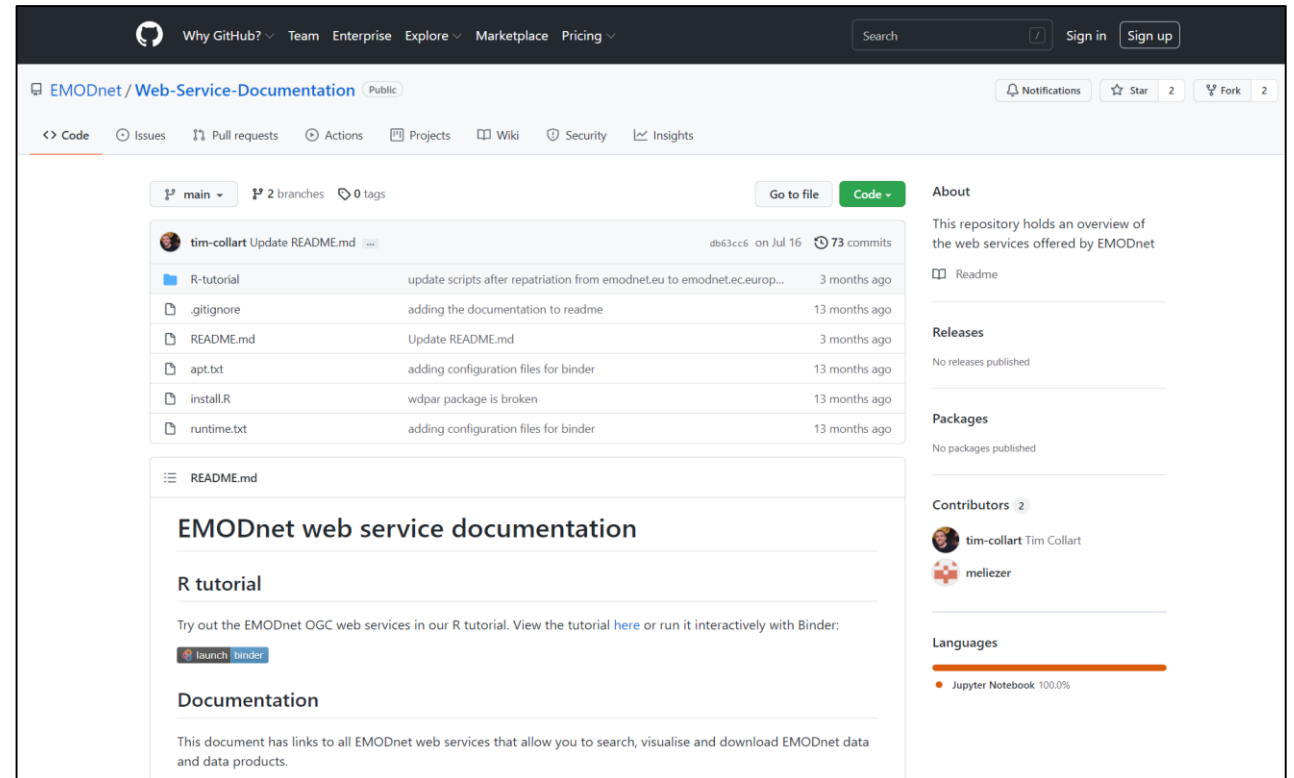
For Biology the Geo Viewer subsets the data using calls to OGC WFS

Webservice documentation and R code examples available on GitHub:

github.com/EMODnet/Web-Service-Documentation

Or

<https://emodnet.ec.europa.eu/en/emodnet-web-service-documentation>



EMODnet | Webservices – monitoring dashboard

Resource Types (41)

- Web Map Service (WMS) (15)
- Web Feature Service (WFS) (11)
- Web Address (URL) (4)
- Catalogue Service (CSW) (5)
- Web Map Tile Service (WMTS) (1)
- Web Coverage Service (WCS) (5)
- Show All

Tags

- EMOD-PACE (2)
- Central Portal (1)
- Human Activities (3)
- Bathymetry (4)
- Biology (3)
- Physics (9)
- Geology (3)
- Seabed Habitats (6)
- Chemistry (10)
- Show All

Settings

- History: 365 days
- Runner in Webapp: False
- Probe Timeout: 45 seconds
- Minimal Run Freq: 10 minutes
- 2023-02-13T09:32:11Z

Resources

Search... (foo, site:.org, title:foo, type:wms, url:example.org)

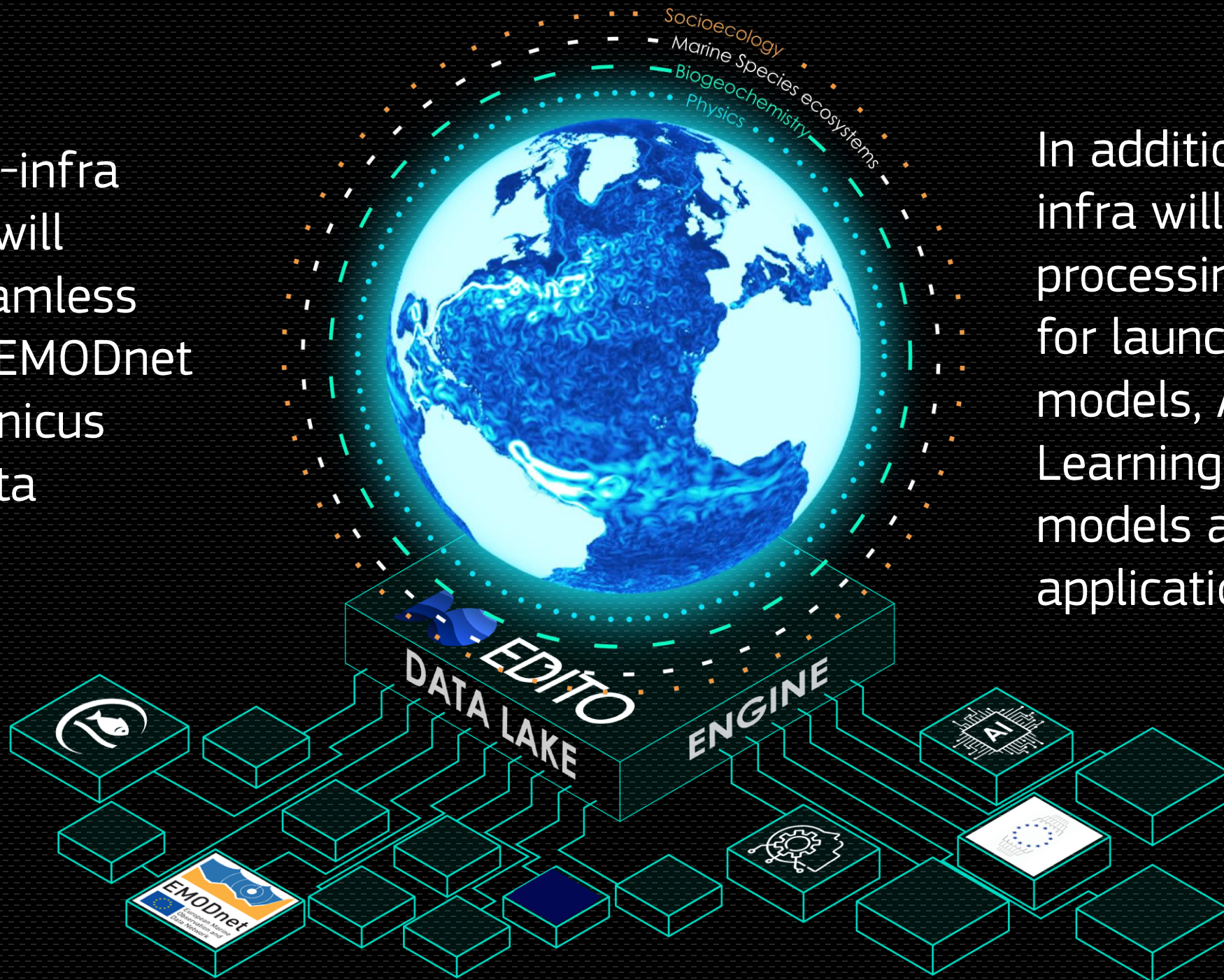
15 results

| Type | Name | Status | Reliability |
|-----------------------|---|--------|-------------|
| Web Map Service (WMS) | EMOD-PACE EU Geoserver WMS EMOD-PACE | ✓ | 99.95% |
| Web Map Service (WMS) | EMODnet Physics (WMS) Physics | ✓ | 98.56% |
| Web Map Service (WMS) | EMODnet Physics (WMS) - new Physics | ✓ | 97.34% |
| Web Map Service (WMS) | EMODnet Biology (WMS) Biology | ✓ | 99.54% |
| Web Map Service (WMS) | EMODnet Bathymetry (WMS) Bathymetry | ✓ | 99.95% |
| Web Map Service (WMS) | EMODnet Chemistry Maris (WMS) Chemistry | ✓ | 98.96% |
| Web Map Service (WMS) | EMODnet Seabed Habitats (WMS) Seabed Habitats | ✓ | 97.45% |
| Web Map Service (WMS) | EMODnet Geology (WMS) Geology | ✓ | 99.16% |
| Web Map Service (WMS) | EMODnet Chemistry Maris P36 (WMS) Chemistry | ✓ | 99.67% |
| Web Map Service (WMS) | EMODnet Human Activities (WMS) Human Activities | ✓ | 99.82% |
| Web Map Service (WMS) | EMODnet Seabed Habitats - Individual (WMS) Seabed Habitats | ✓ | 97.55% |
| Web Map Service (WMS) | EMODnet Chemistry OGS (WMS) Chemistry | ✓ | 99.95% |
| Web Map Service (WMS) | EMODnet Chemistry ULG (WMS) Chemistry | ✓ | 99.89% |
| Web Map Service (WMS) | EMODnet Chemistry Ifremer (WMS) Chemistry | ✓ | 99.35% |
| Web Map Service (WMS) | EMOD-PACE NMDIS GeoNode WMS EMOD-PACE | ✓ | 99.97% |

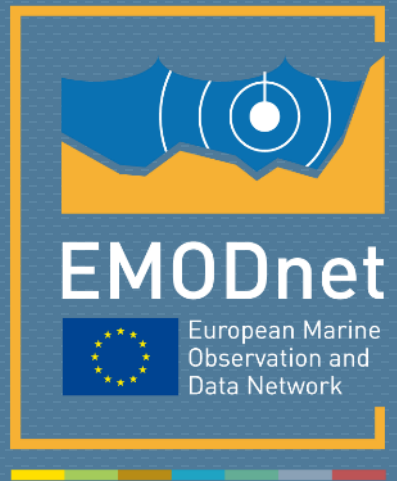
<https://monitor.emodnet.eu/>

- All EMODnet thematic data servers are still running, publishing data and data products via Open webservices. This presents some challenges:
 - **Performance:** the nature of a federated service means that the quality of service and performance can be affected by a problem in one of the remote servers. Once a problem is spotted the thematic assembly group is notified.
 - **Consistency of metadata:** the developments over the past 10 years led to slight variations in the way each thematic group publishes their metadata. Work is in progress to ensure that uniformity is achieved (e.g., using a standard Open Data License)
 - **Consistency of behaviour and change control:** Thematic groups have gone from running their own web portals to being a data feed into a distinct web portal. An operational 'mind shift' was needed as sometimes changes made to the thematic services can have unforeseen consequences in the EMODnet portal. To minimise impacts we are developing and implementing management procedures related to content publishing.
- Some products are locally hosted in the Central Portal to provide a better user experience by improving performance and delivering services that were not possible before (i.e., sub-setting data products and direct downloads).

The EDITO-infra data lake will enable seamless access to EMODnet and Copernicus Marine data



In addition EDITO-infra will set-up a processing engine for launching models, AI Machine Learning, Hybrids models and applications



emodnet.ec.europa.eu

Your gateway to marine data in Europe





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Slide X: top image from xxx, source: xxx

EMODnet | The result of data sharing and working together

Unlocking and democratising marine data from diverse sources

