



European Marine Data Exchange

By

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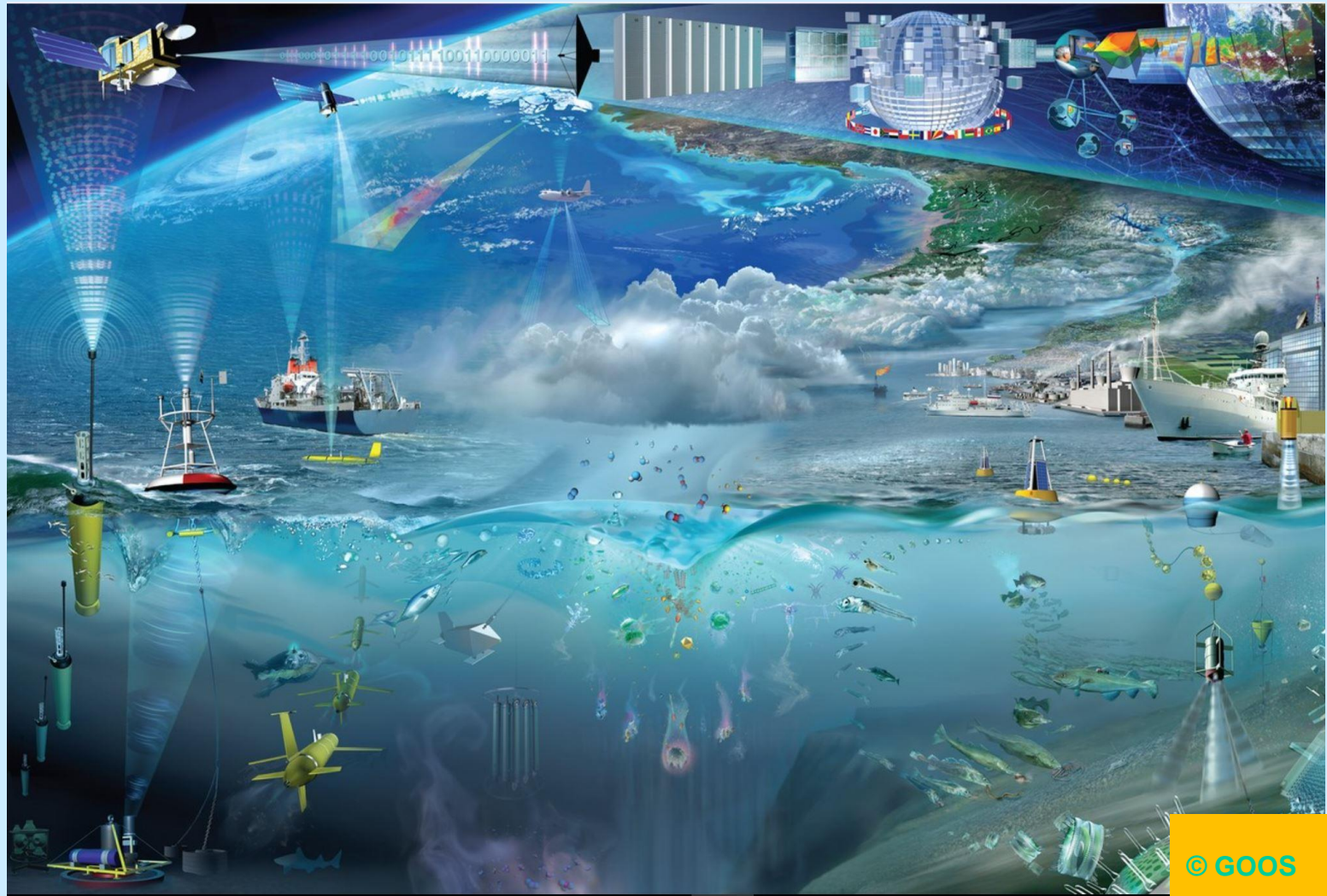
EU SeaDataNet Technical Coordinator

EU EMODnet Ingestion Coordinator

Noordzeedagen 2018 - October 2018



Acquisition of ocean and marine data



© GOOS

Data are important for science, governance, and economy

Data acquisition in Europe

- Data are collected by governments, research institutes, and private industry (in Europe more than 1.000 organisations)
- Data for physics, geophysics, meteorology, chemistry, biology, geology, bathymetry
- Acquisition of oceanographic and marine data is expensive; annual costs in Europe estimated at **1.4 Billion Euro** (1.0 = in-situ; 0.4 = satellites)



Professional data management is required with agreements on standardisation, quality control protocols, long term archiving, catalogues, and access



SeaDataNet pan-European data management infrastructure



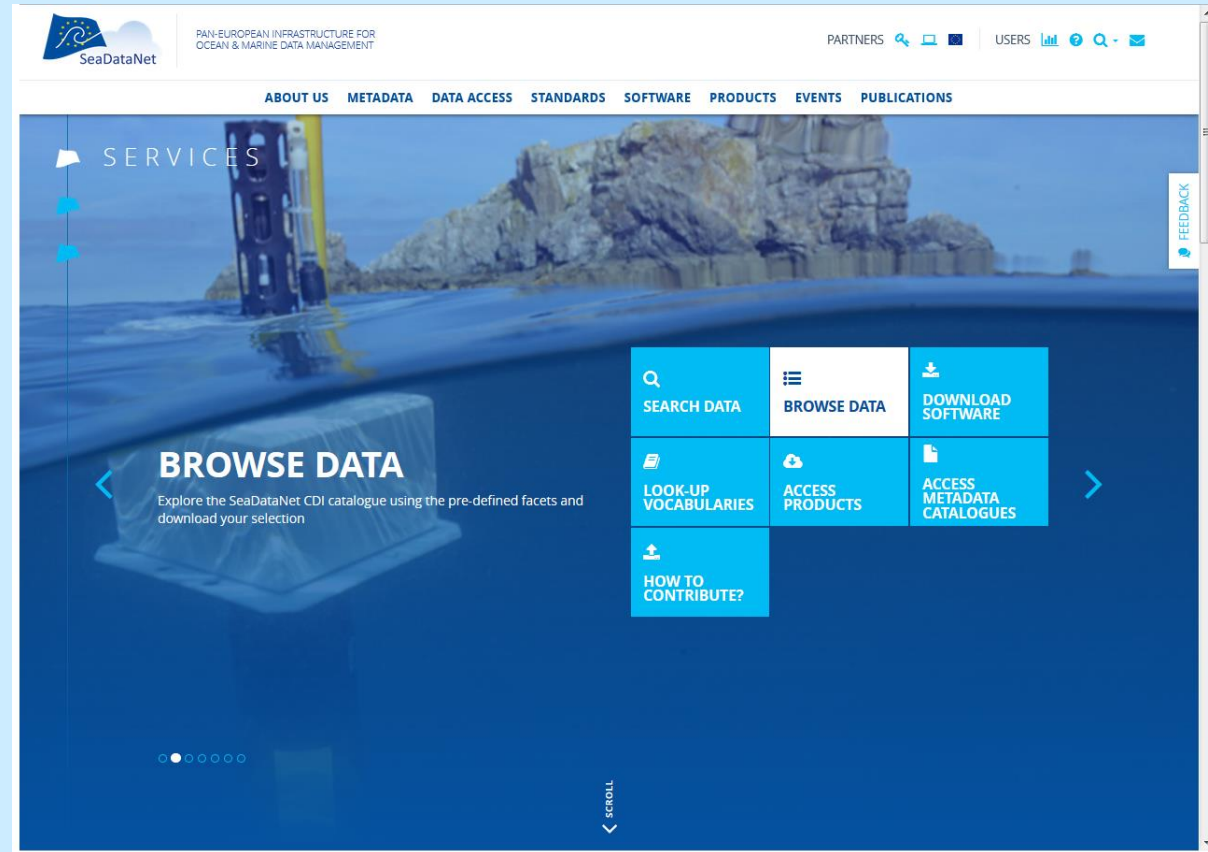
National Oceanographic Data Centres (**NODCs**) and major marine research institutes from 34 countries have been building and operating the **SeaDataNet** pan-European infrastructure for managing marine and ocean data with co-funding by the European Commission since early 2000



SeaDataNet portal as 'one stop shop'

Giving access to

- Standards, tools, and services, for data centres and other users
- Data and metadata
- Products

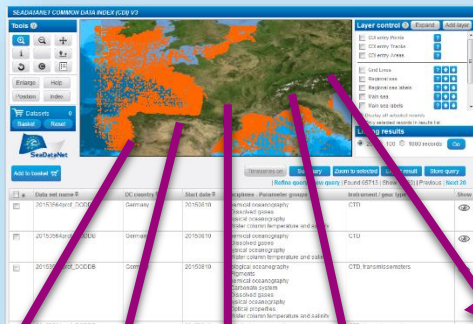


<http://www.seadatanet.org>

CDI (Common Data Index) service for discovery and unified data access

At present **2.15 million** CDI entries from **34** countries, **110** data centres and **>650** originators for physics, chemistry, geology, geophysics, bathymetry and biology; from **1805 to 2018**; **87.6%** unrestricted or under SDN License

SeaDataNet portal

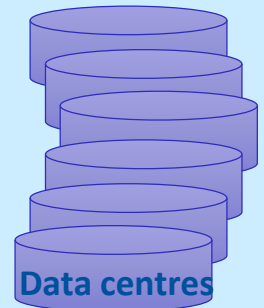
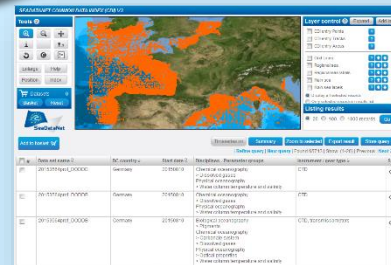


Search and Shop



Data download


Already 110 data centres connected and more underway



*European data sources
data centres > 650 originators*
















*Metadata
+ transaction data*

From data discovery to unified access and delivery


 PAN-EUROPEAN INFRASTRUCTURE FOR
OCEAN & MARINE DATA MANAGEMENT

**SEADATANET COMMON DATA
INDEX (CDI) V3**

TOOLS

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-  Datasets **0**
- 
- 

SEARCH

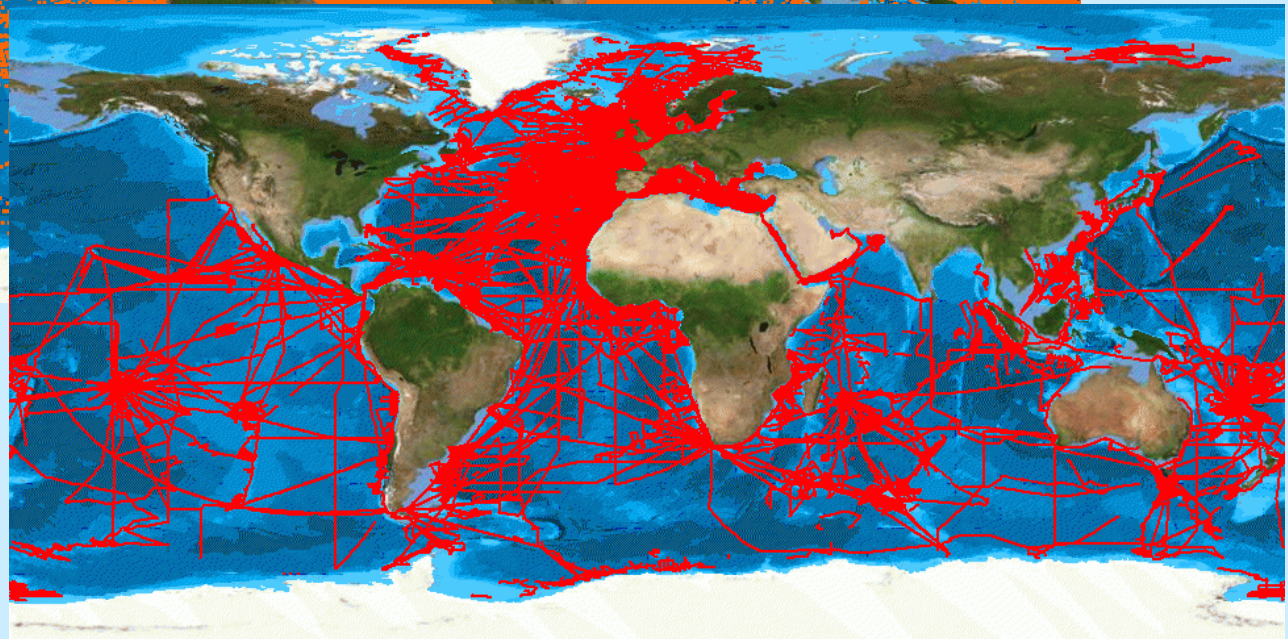
Free search  **SEARCH**

Disciplines - Topics

- All
- Administration and dimensions
- > Administration and dimensions
- Atmosphere
- > Atmospheric chemistry

Discovery parameters

- All
- Acoustic backscatter in the water column
- Acoustic noise in the water column

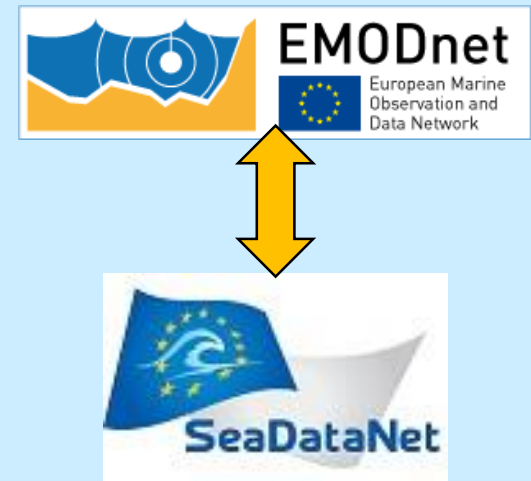


SeaDataNet cooperation

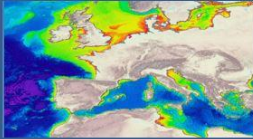

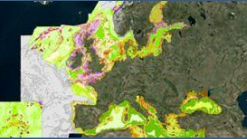
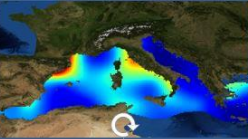



- **Copernicus Marine Environmental Monitoring Services (CMEMS):** providing long-term archives and standards
- **Marine Strategy Framework Directive (MSFD):** providing infrastructure, standards and data collections for several indicators
- **Large ocean monitoring systems (EuroGOOS, AtlantOS, Euro-ARGO, JERICO-Next, ..):** providing standards and validation + long-term archiving services
- **Ocean Data Interoperability Platform (ODIP):** exploring and demonstrating common standards and interoperability with leading data management infrastructures in USA and Australia
- **GEOSS - EuroGEOSS:** Maintaining the GEOSS portal with SeaDataNet in-situ data collections from large community of European data holders (> 100 data centres; >600 data originators)
- **European Open Science Cloud (EOSC):** shaping the pilot Blue Cloud
- **European Marine Observation and Data Network (EMODnet)** driven by Marine Knowledge 2020 and Blue Growth

SeaDataNet and EMODnet


- EU initiative for an overarching **European Marine Observation and Data Network (EMODNet)** driven by Marine Knowledge 2020 and Blue Growth
- SeaDataNet qualified as a leading infrastructure for the EMODnet data management component and is driving several thematic portals from the start in 2008
- *'Bottom-up meets top-down'*
- This synergy has resulted in many more data centres adopting SeaDataNet standards and connecting to the CDI Data Discovery and Access service while it gave a flying start to EMODnet




EMODnet thematic portals

<u>Bathymetry</u>	<u>Geology</u>	<u>Seabed Habitats</u>	<u>Chemistry</u>	<u>Biology</u>	<u>Physics</u>	<u>Human activities</u>
						
<p>Minimum cell water depth</p> <p>Maximum cell water depth</p> <p>Average cell water depth</p> <p>Standard deviation of cell water depth</p> <p>Number of values used for interpolation of cell water depth</p> <p>Horizontal coordinate reference system</p> <p>Depth reference system</p> <p>Lowest Astronomical Tide</p>	<p>Seabed substrate</p> <p>Sediment accumulation rate</p> <p>Sea-floor geology</p> <p>Seabed lithology</p> <p>Stratigraphy</p> <p>Coastline migration</p> <p>Aggregate resources</p> <p>Geological events</p>	<p>Data on modelled seabed habitats (depth, seabed substrate, broad scale biological zone, T, S, light, oxygen, energy due to waves & current)</p> <p>Broad-scale physical habitat map</p> <p>Detailed habitat maps from surveys</p> <p>Individual habitat modelling outputs</p> <p>Habitat point data</p>	<p>Pesticides & Biocides</p> <p><u>Antifoulants</u></p> <p><u>Pharmaceuticals</u></p> <p>Heavy Metals</p> <p>Hydrocarbons</p> <p>Radionuclides</p> <p>Fertilizers</p> <p>Acidity</p> <p>Dissolved Gasses</p> <p>Plastics</p> <p>Marine Litter Beach litter Seafloor litter Micro litter</p> <p>Chlorophyll Silicates Organic Matter</p>	<p>Biomass</p> <p>Abundance</p> <p>Gridded Abundance maps</p> <p><i>species groups:</i></p> <ul style="list-style-type: none"> • phytoplankton • zooplankton • angiosperms • macro-algae • invertebrate bottom fauna • birds • mammals • reptiles • Fish 	<p>Waves</p> <p>Water temperature</p> <p>Water salinity/conductivity/density</p> <p>Currents</p> <p>Light attenuation/fluorescence</p> <p>Sea level</p> <p>Atmospheric parameters</p> <p>Wind</p> <p>Underwater noise</p> <p>Rivers</p> <p>Ice</p>	<p>Aggregate Extraction Dredging</p> <p>Fisheries</p> <p>Hydrocarbon Extraction Main Ports</p> <p><u>Mariculture</u></p> <p>Ocean Energy Facilities</p> <p>Pipelines and Cables</p> <p>Protected Areas</p> <p>Waste Disposal</p> <p>Wind Farms</p> <p>Other Forms of Area Management / Designation</p>

EMODnet Bathymetry portal




BATHYMETRY
Understanding the topography of the European seas

Free search 

[CONTACT](#) [SUBMIT DATA](#)

[APPROACH](#) [METADATA & DATA](#) [DATA PRODUCTS](#) [NEWS](#) [PROMOTION](#) [PARTNERS](#) [HELPDESK](#)




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Developing and providing a harmonised Digital Terrain Model (DTM) for the European sea regions

SURVEY DATA SETS

CDI Data Discovery and Access service


[READ MORE](#)



EMODnet DTM

Bathymetry Viewing and Download service


[READ MORE](#)



COMPOSITE DTM

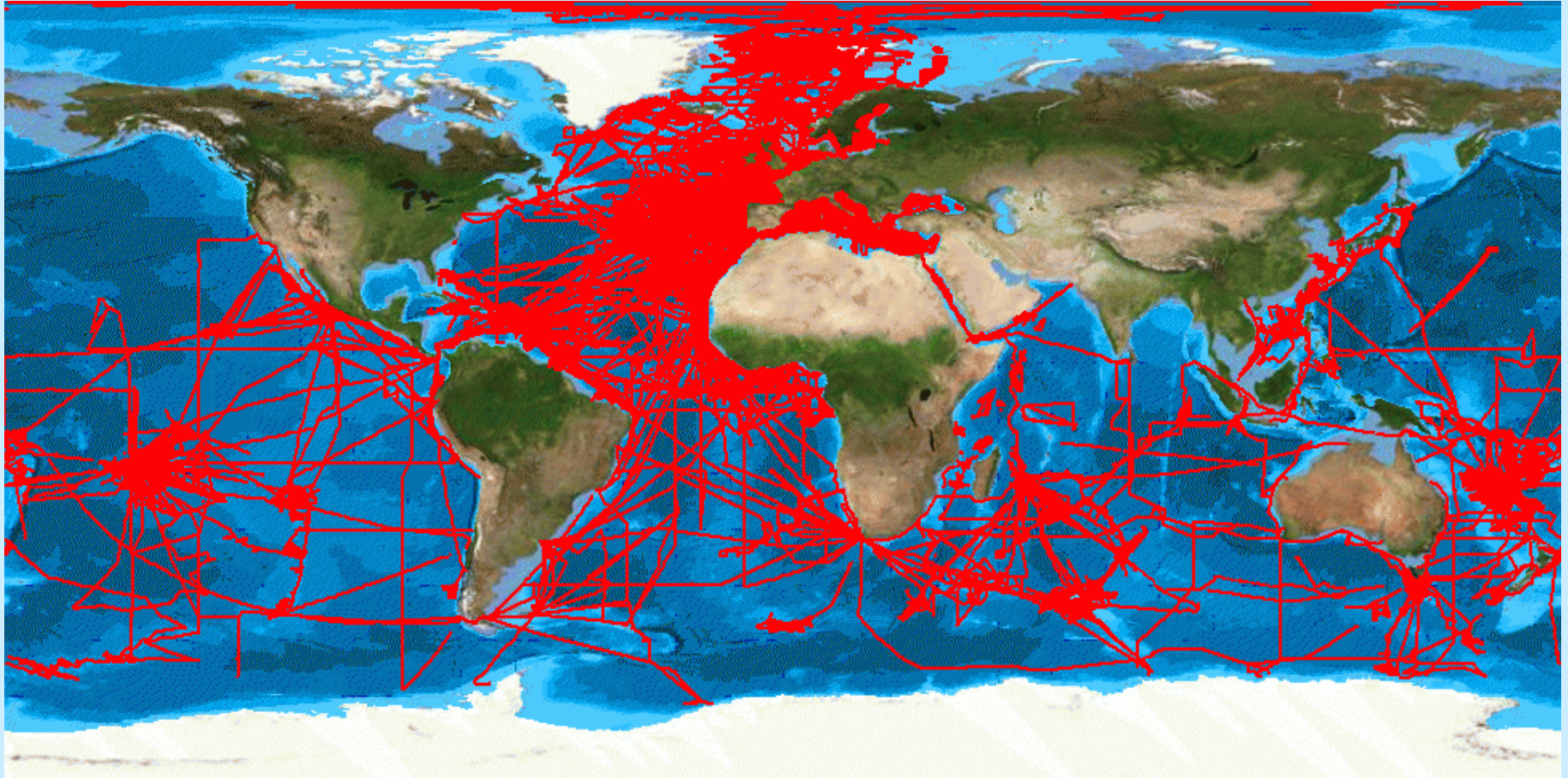
Sextant Catalogue service

[READ MORE](#)



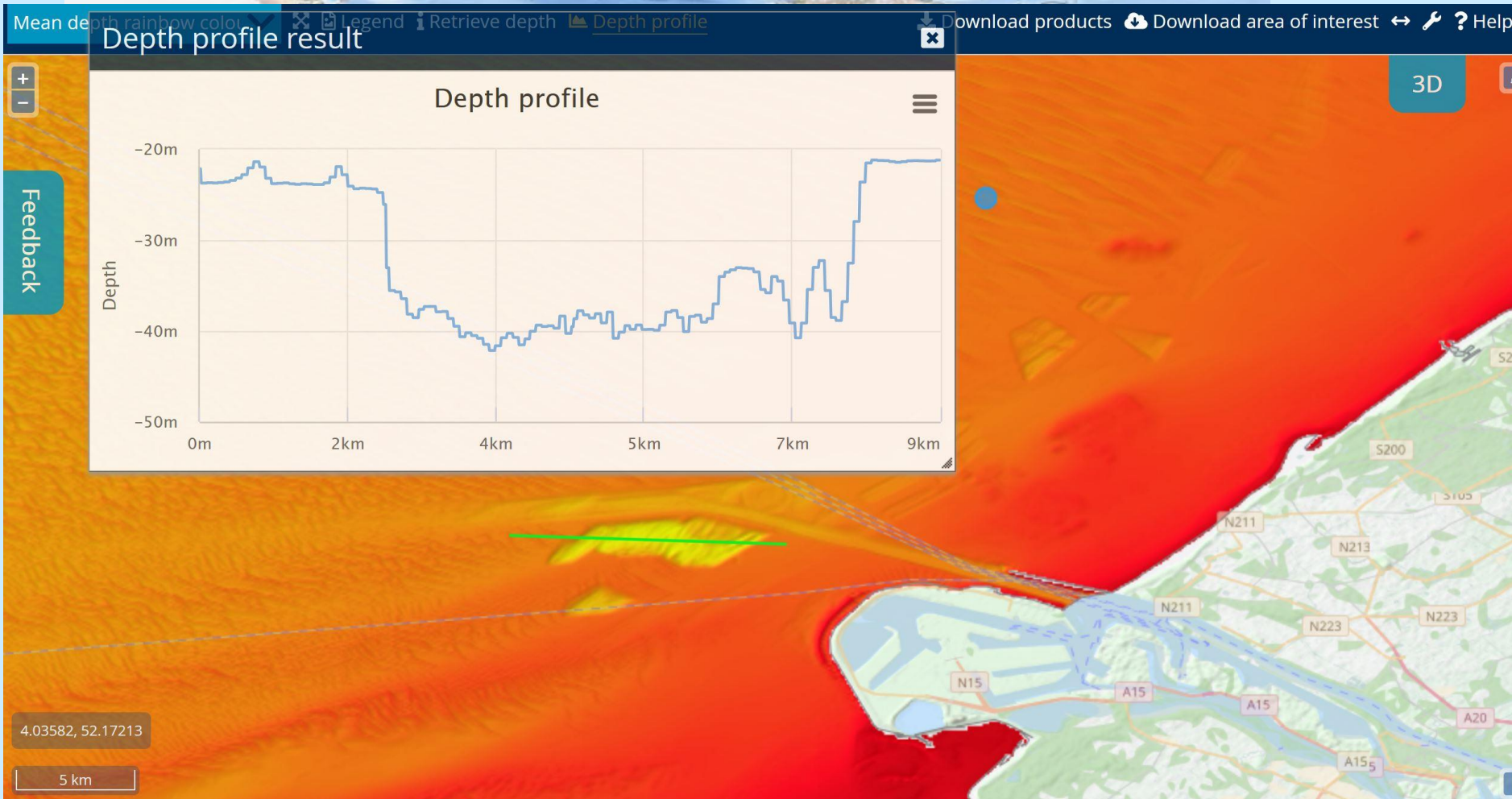
www.emodnet-bathymetry.eu

Bathymetry – gathered data

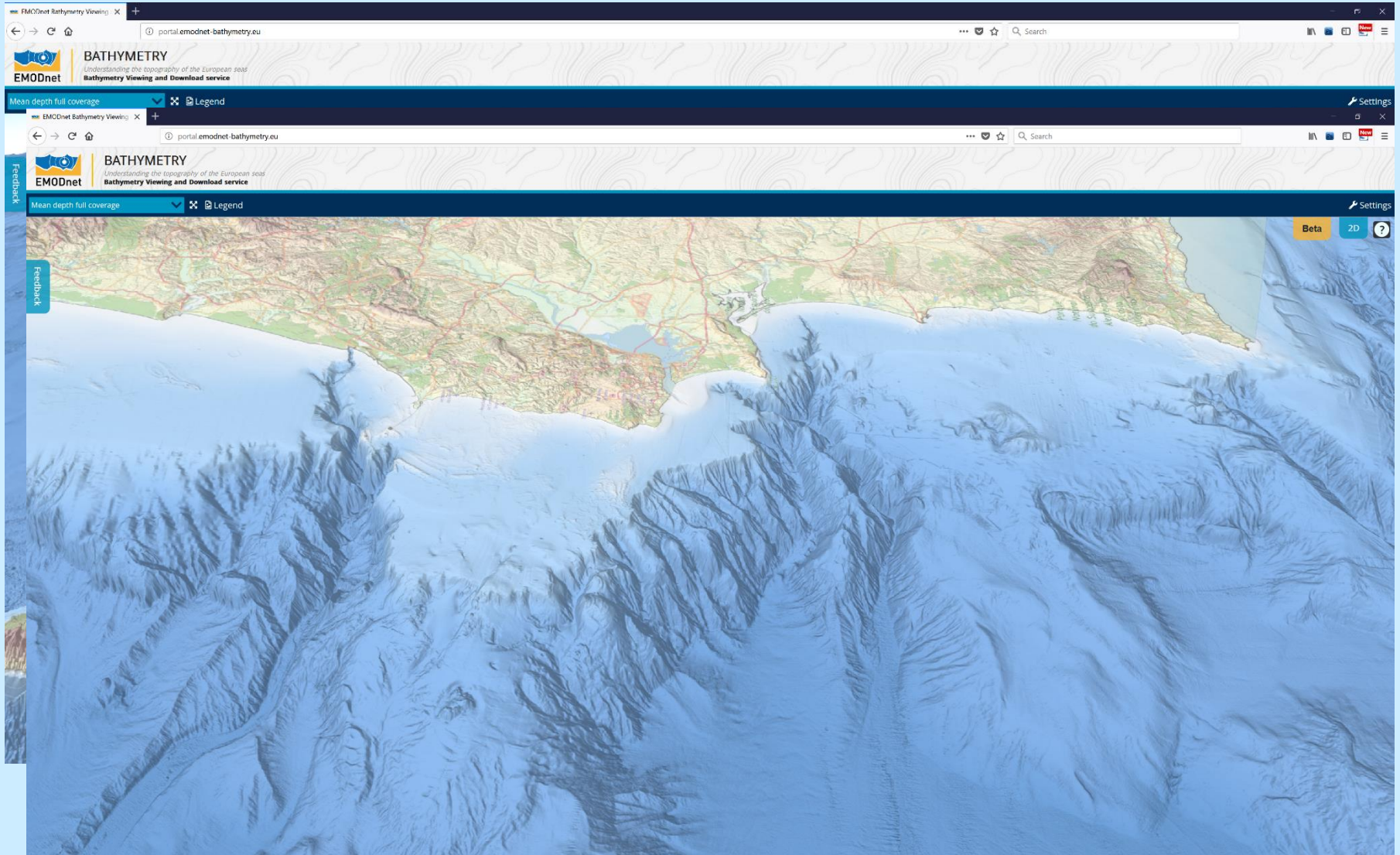


> 27.000 survey data sets from 50+ European data providers indexed in the CDI data discovery and access service


New EMODnet DTM released (115 * 115 m2)



3D visualisation in the browser



Source reference map (> 9.400 data sets from 48 data providers used as input)

**BATHYMETRY**
Understanding the topography of the seafloor
Bathymetry Viewing

Source references

Feedback

Details

| [Results](#) | Found 331 | Show 292 | [Previous](#) | [Next](#)

XML

WHAT?

Data set name

Texel-IJmuiden

Discipline

Marine geology
Terrestrial

Parameter groups

Gravity, magnetics and bathymetry
Terrestrial

Discovery parameters

Bathymetry and Elevation

GEMET-INSPIRE themes

Oceanographic geographical features

Abstract

The Hydrographic Service of the Royal Netherlands Navy informs mariners about shipping routes, the seabed and underwater hazards such as shipwrecks. To this end, the Hydrographic Service compiles nautical charts, carefully details the maritime borders of the Netherlands and carries out depth measurements. The referenced survey is carried out to support these tasks.

Data format


XYZ ASCII **Version 1.0**

Data set creation date

20171218

WHERE?

Map

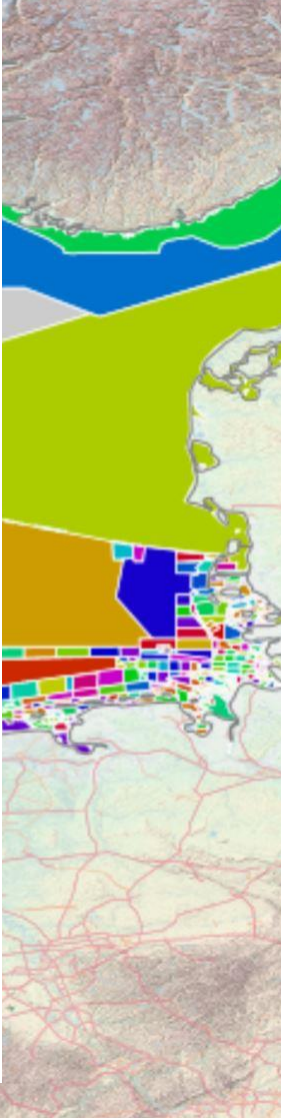


GML id

ms01

GML objects

Name	Description
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EMODnet Chemistry

The screenshot shows the EMODnet Chemistry website. The header features the EMODnet logo, the word "CHEMISTRY" in large blue letters, and the tagline "Data & products on marine water quality". To the right is a search bar and links for "CONTACT US" and "SUBMIT DATA". Below the header is a dark blue navigation bar with links: "ABOUT", "DATA", "PRODUCTS", "DOCUMENTS", "NEWS & EVENTS", and "HELP". The main content area has a background image of a rocky coastline. On the left, a hexagonal grid highlights four topics: "OCEAN ACIDIFICATION", "EUTROPHICATION", "CONTAMINANTS", and "MARINE LITTER". To the right of this grid, a text block states: "The EMODnet Chemistry portal provides easy access to marine chemical data, standardised harmonized validated data collections and reliable data products, highly relevant to assess ecosystem status according to the Marine Strategy Framework Directive". At the bottom, there are two map-based sections: "Discover Data" on the left and "Discover Data Products" on the right. The "Discover Data Products" section includes a "Quick Question" icon and a "Speak to us" link, and a green "Online" status indicator is visible in the bottom right corner.

EMODnet | **CHEMISTRY**
Data & products on marine water quality

Search

[CONTACT US](#) [SUBMIT DATA](#)

[ABOUT](#) [DATA](#) [PRODUCTS](#) [DOCUMENTS](#) [NEWS & EVENTS](#) [HELP](#)

OCEAN ACIDIFICATION
EUTROPHICATION
CONTAMINANTS
MARINE LITTER

The EMODnet Chemistry portal provides easy access to marine chemical data, standardised harmonized validated data collections and reliable data products, highly relevant to assess ecosystem status according to the Marine Strategy Framework Directive

Discover Data

Discover Data Products

Quick Question
Speak to us

Online

www.emodnet-chemistry.eu

EMODnet Chemistry

- Gathers chemistry data sets from **research and monitoring** activities
- Develops standardized harmonized validated **data collections** and **concentration maps** of **nutrients** (NO₃, PO₄, SiO₄, NO_x, NH₄, Total N, Total P), chlorophyll a and dissolved oxygen
- Develops long time series of **contaminants concentrations**
- Develops European databases and maps for **marine litter** (beach litter, floating litter, and micro litter) cooperating with TG-ML, Regional Sea Conventions, ICES, and others

EMODnet Chemistry matrix

MSFD regions

Group of Variables	Baltic Sea	Iberian peninsula - Macaronesia - Bay of Biscay	Greater North Sea - Celtic Sea - Faroes	Arctic Ocean - Norwegian Sea - Greenland Sea - Barents Sea - Icelandic Waters	Mediterranean Sea	Black Sea - Sea of Azov - Marmara Sea
Acidity ⁱ	■	■	■	■	■	■
Antifoulants ⁱ	■	■	■		■	■
Chlorophyll ⁱ	■	■	■	■	■	■
Dissolved gasses ⁱ	■	■	■	■	■	■
Fertilisers ⁱ	■	■	■	■	■	■
Hydrocarbons ⁱ	■	■	■	■	■	■
Heavy metals ⁱ	■	■	■	■	■	■
Organic matter ⁱ	■	■	■	■	■	■
Polychlorinated biphenyls ⁱ	■	■	■		■	■
Pesticides and biocides ⁱ	■	■	■	■	■	■
Radionuclides ⁱ	■		■	■	■	■
Silicates ⁱ	■	■	■	■	■	■
<div> <div>■ 1-50</div> <div>■ 251-1000</div> <div>■ 2501-5000</div> <div>■ 10001-25000</div> <div>■ 51-250</div> <div>■ 1001-2500</div> <div>■ 5001-10000</div> <div>■ >25000</div> </div>						

Legend - number of measurement data sets for each variable per marine region

water column, sediment and biota

CDI service in EMODnet Chemistry

CHEMISTRY

Summary

Export

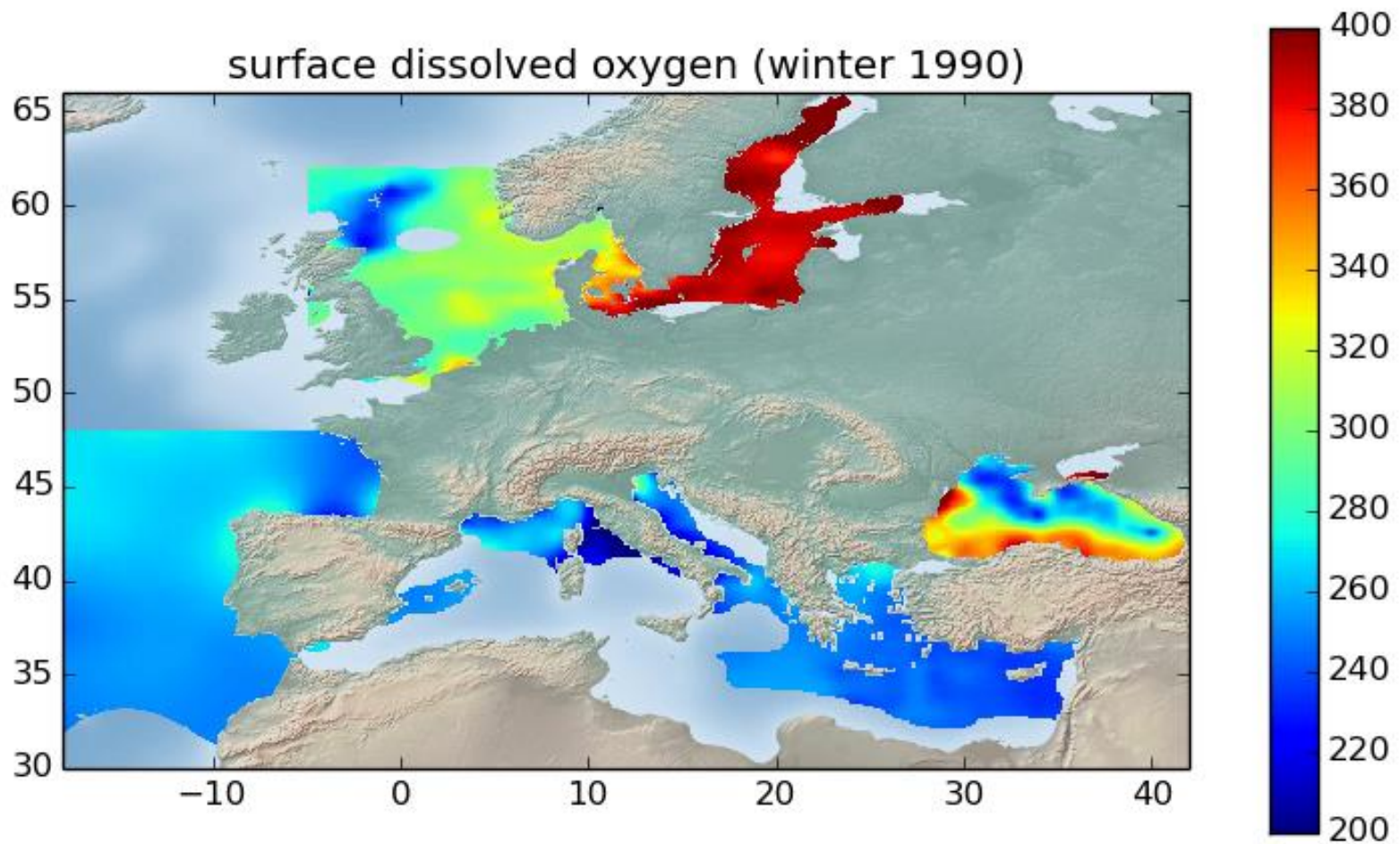
PER CDI PARTNER

Per CDI Partner	Country	Datasets
British Oceanographic Data Centre	United Kingdom	11457
International Council for the Exploration of the Sea (ICES)	Denmark	5632
German Oceanographic Datacentre	Germany	3322
Rijkswaterstaat Water, Traffic and Environment	Netherlands	2705
Management Unit of North Sea and Scheldt Estuary Mathematical Models, Belgian Marine Data Centre	Belgium	1229
Flanders Marine Institute	Belgium	750
Aarhus University, Department of Bioscience, Marine Ecology Roskilde	Denmark	506
IFREMER / IDM / SISMER - Scientific Information Systems for the SEA	France	438
Swedish Meteorological and Hydrological Institute	Sweden	247
BRGM / Office of Geological and Mining Resources	France	163
All-Russia Research Institute of Hydrometeorological Information - World Data Centre (RIHMI-WDC) National Oceanographic Data Centre (NODC)	Russian Federation	69
PANGAEA - Data Publisher for Earth & Environmental	Germany	44

DC country Start date Disciplines - Topics Instrument / gear t

Heavy Metals in the MSFD North Sea region

Seasonal concentration maps



SeaDataNet as driver and contributing to many portals

Total collection



Data discovery
And access



> 110 data centres



NODCs; HOs; GEOs; BIOS; ICES;

> 650 European data
originators



GEOSS portal



IODE ODP portal

Aggregated collection



Black Sea portal



Caspian portal

Regional subsets



Geo-Seas portal

Thematic subsets

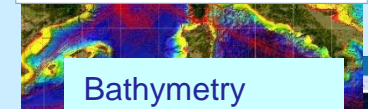
Thematic subsets

Thematic subsets

Thematic subsets

Thematic subsets

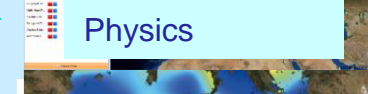
Thematic subsets



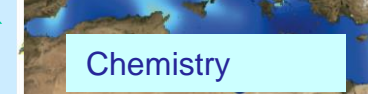
Bathymetry



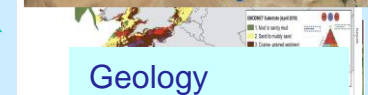
Physics



Chemistry



Geology



Biology

**CDI Data Discovery
and Access service**

WaLTER – Wadden Sea portal

The screenshot displays the WaLTER Wadden Sea portal interface. The top header features the 'wadden sea LONG-TERM ECOSY' logo on the left and a navigation bar with 'BASKET 0 items', 'View basket', 'Check orders', and 'Register here'. Below the header, a map of the Wadden Sea area is shown, overlaid with a dense network of red lines representing data layers. The map includes labels for various locations such as Leeuwarden, Franeke, Burgum, and Drachten, as well as geographical features like 'Natuurlijk Park De Alde Feanen'. A sidebar on the left contains navigation links: 'thema's', 'tools', 'publicaties', 'over walte', and 'zoeken'. The bottom status bar indicates 'Status Loading browse'.

<https://www.walterwaddenmonitor.org/>

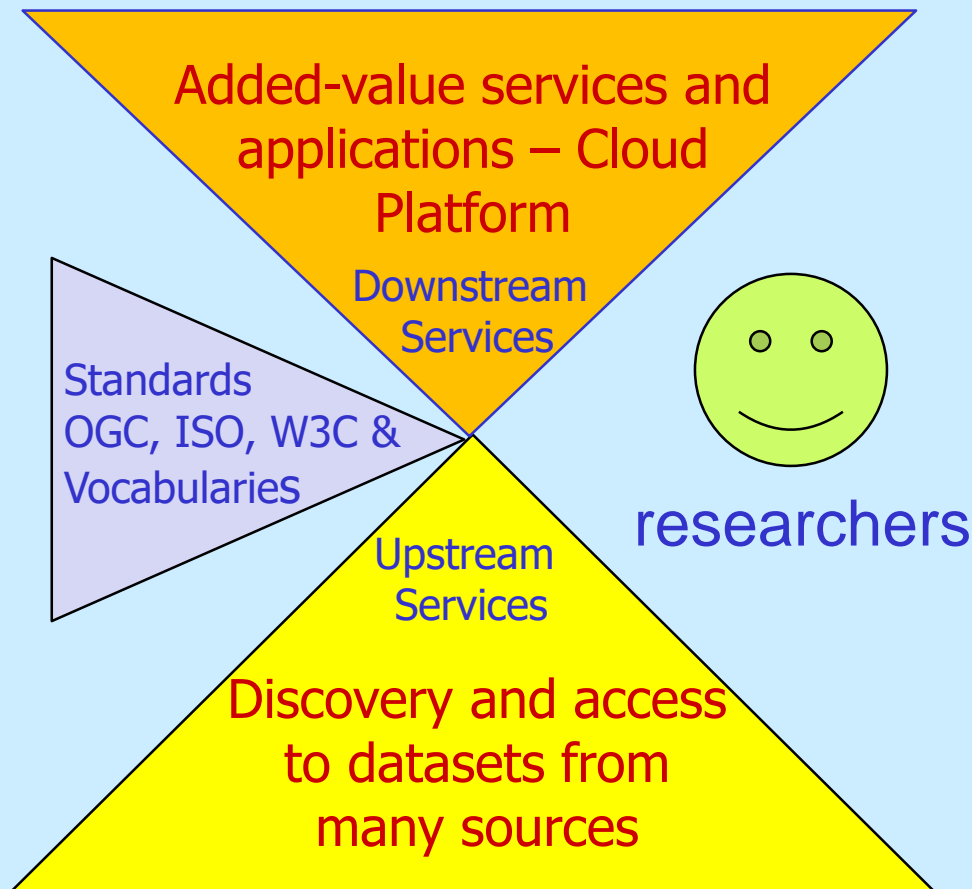
Importance of good data management

- The EMODnet added value products are only possible because of a well organised data management which starts at the base
- The SeaDataNet – EMODnet infrastructure is federated and builds upon data management systems operated by organisations in the different countries

‘Collect once, use many times for different applications’

- Adopting common standards facilitates exchange and sharing of data
- Applying **FAIR** principles: **F**indable, **A**ccessable, **I**nteroperable and **R**eusable

Towards a Blue Cloud as blue print for the European Open Science Cloud (EOSC)



- Cloud platform with common services for data pre-processing, analyses, visualizations, publishing, DOIs...
- Applying common standards and interoperability solutions for providing harmonised data and metadata
- Providing harmonised discovery and access to data output from multiple sources, European and international

EMODnet Ingestion – wake up your data



EMODnet | **DATA INGESTION PORTAL**
Wake up your data – set them free for Blue Society

Search [CONTACT](#)

[ABOUT](#) [DATA SUBMISSION](#) [OPERATIONAL DATA](#) [SUBMISSIONS](#) [GUIDELINES](#) [DATA WANTED](#) [HELP](#) [PROMOTION](#) [CENTRAL PORTAL](#)

Home

Welcome to the EMODnet Data Ingestion portal

The European Marine Observation and Data Network (EMODnet) consists of more than 160 organisations that together work on assembling, harmonising and making marine data, products and metadata more available to public and private users. This Data Ingestion portal facilitates additional data managers to ingest their marine datasets for further processing, publishing as open data and contributing to applications for society.

[READ MORE](#)


EMODNET INGESTION

CHECK OUT



Submit your data files

The online Data Submission service facilitates you to submit marine datasets by completing a form and



Ingest operational data

We are also interested in (Near) Real-Time ((N)RT) data streams from fixed and autonomous ocean



View submissions

View, search and download datasets that have been submitted by data providers using the Data

Animation