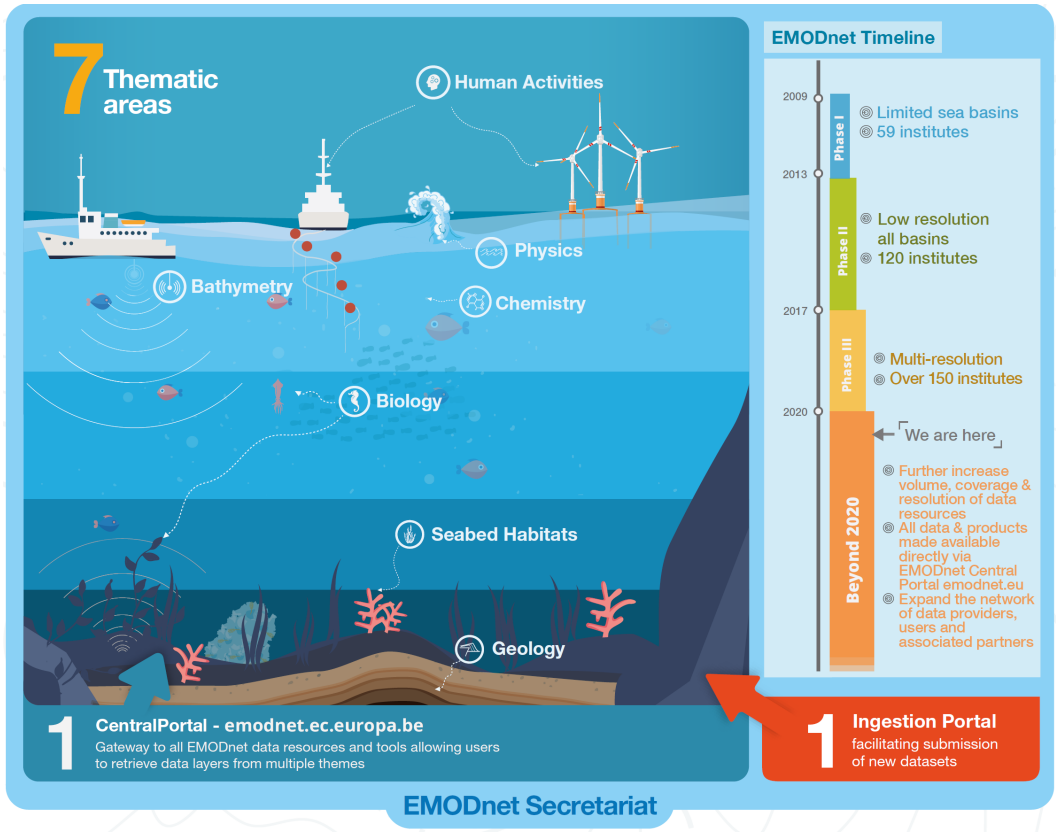
EMODnet Physics

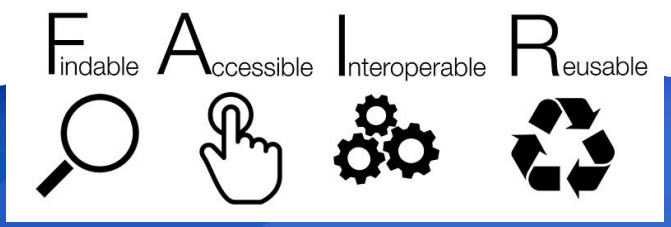
Antonio Novellino, EMODnet Physics

The European Marine Observation and Data Network (EMODnet) is financed by the European Union under Regulation (EU) 2021/1139 of the European Parliament and of the Council of 7 July 2021 establishing the European Maritime, Fisheries and Aquaculture Fund.

A public EU *in situ* marine data service, open to all



- **7 EMODnet thematic domains, 100s parameters**
- ***in situ* (in water) data from the marine**
- **environment and human activities at sea**
- **Datasets**
  - ✓ **Sourced & aggregated from hundreds of diverse data providers**
  - ✓ **Standardised & harmonised to EU and international standards**
  - ✓ **Integrated into high resolution data layers**
  - ✓ **Open source and open access**
- **Data products with data policy Creative Commons BY4.0 e.g., maps, composite maps, predictive capability;**
- **Metadata describing data, using international (ISO) standards;**
- **European seas and beyond including global datasets and maps.**



One central map viewer

to visualise all EMODnet data

1 OCEAN 1 EMODnet

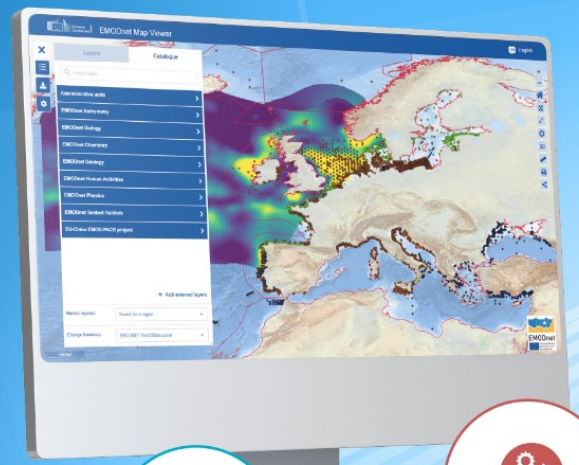
One single portal

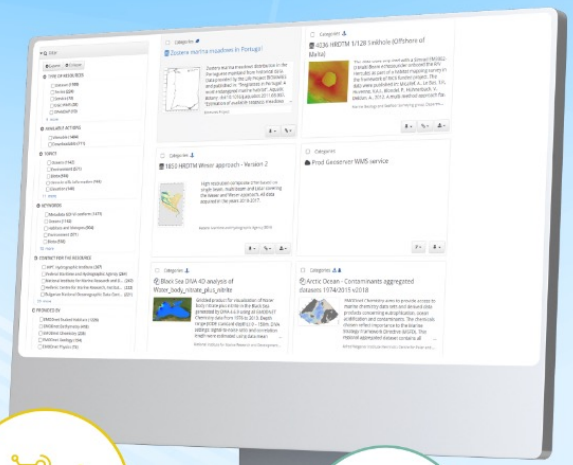
One central metadata catalogue

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

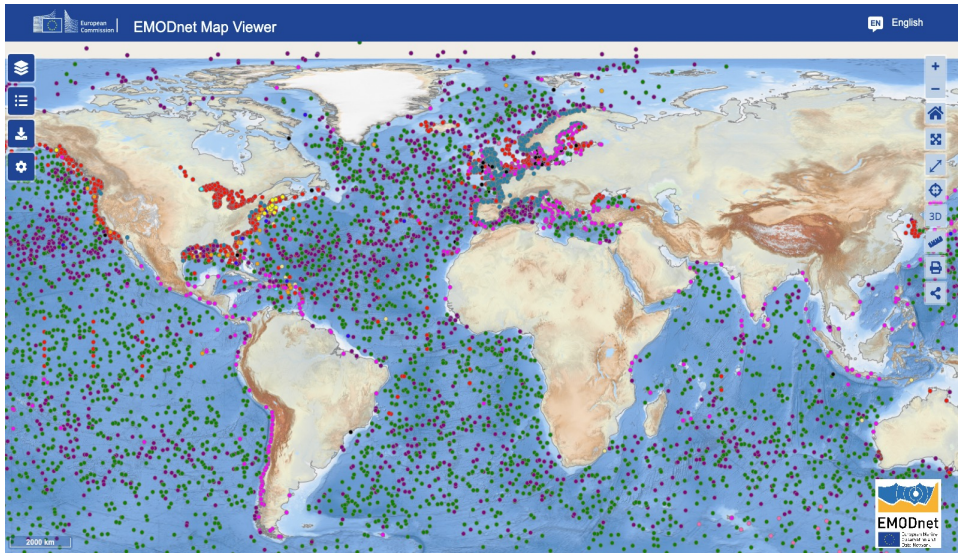
YOUR GATEWAY TO *IN SITU* MARINE DATA IN EUROPE AND BEYOND

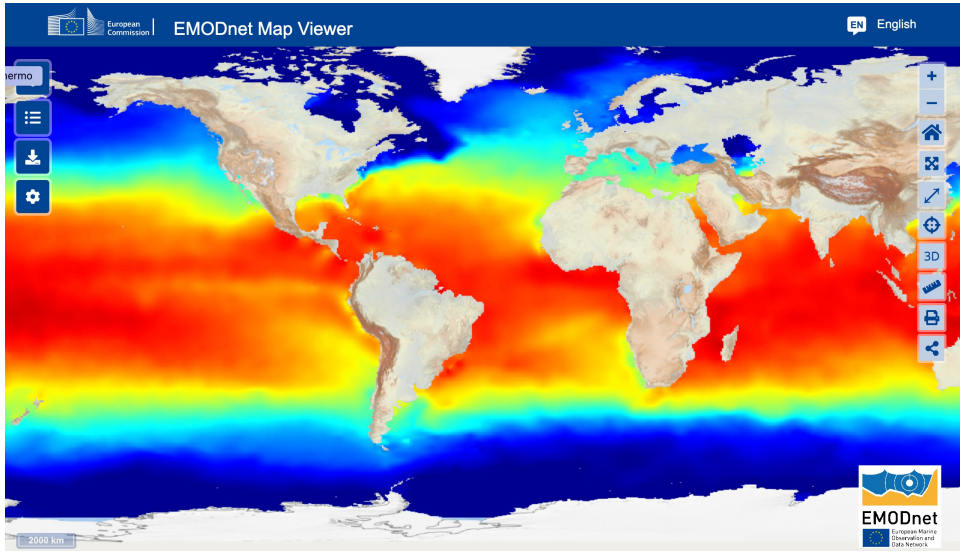
EMODnet
European Marine Observation and Data Network

European Marine Observation and Data network – EMODnet Physics

- focuses on **in situ** data and products,
- integrates and makes available **near real time and delayed** mode data on ocean physics
- builds on available **marine data infrastructures and programs**
- supports **common standards** and tools
- develops **new pipelines** to include and facilitate data access (**FAIR**)

Temperature, Salinity, Sea Level, Currents, Waves and Winds, Optical properties of the water, Under water noise, Ice data, River runoff, Meteorological data at sea level





New landing area for projects and projects docs

European Commission

Search

Energy, Climate change, Environment

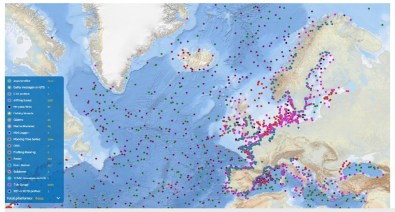
European Marine Observation and Data Network (EMODnet)

About | Data Services | Solutions | Themes | Community Pages | Atlas of the Seas | EU-China | News & Events | FAQ Downloads

Home > Themes > Physics

Physics

EMODnet Physics is an upstream ocean data integrating service. It builds on the discovery of data sources or providers and their connection to the EMODnet Physics infrastructure. It provides a single point of access to in situ ocean physics time-series data and vertical profiles, data products and metadata built with common standards, free of charge and no restrictions. The available parameters cover temperature, salinity and currents profiles, sea level trends, wave height and period, wind speed and direction, water turbidity (light attenuation), underwater noise, river flow, and sea-ice coverage.



Data on temperature, salinity and currents in the water column, sea level trends, wave height and period, wind speed and direction, water turbidity (light attenuation), underwater noise, river flow, and sea-ice coverage.

- Objectives
- Background
- Approach
- Products
  - Temperature & Salinity
  - Sea Surface Currents
  - Sea Level
  - Wave
  - River Runoff
  - Water Clarity
  - Noise Events
  - Ice
- Reports
- Media
- Use Cases
- News

Products

Temperature and Salinity in the water column

Temperature is a crucial component of the climate system and its variability in the water column. Sea-surface temperature (SST) has a significant impact on energy, momentum, and gas exchanges between the ocean and atmosphere. Daily variations in SST can exceed 3°C and can lead to changes of over 10 Wm-2 in the surface energy budget in the tropics and subtropics.

Subsurface ocean temperature is a fundamental observation for understanding various ocean phenomena that influence climate, including ocean stratification, circulation, mixed layer dynamics, water mass properties, and coastal shelf-open ocean exchange. Profiling subsurface temperature observation systems also contribute to in-situ validation of satellite observations of surface temperature. Changes in ocean temperature, for instance, can impact the growth rate of farmed fish, as well as the distribution and abundance of wild fish stocks and other economically and socially valuable marine species.

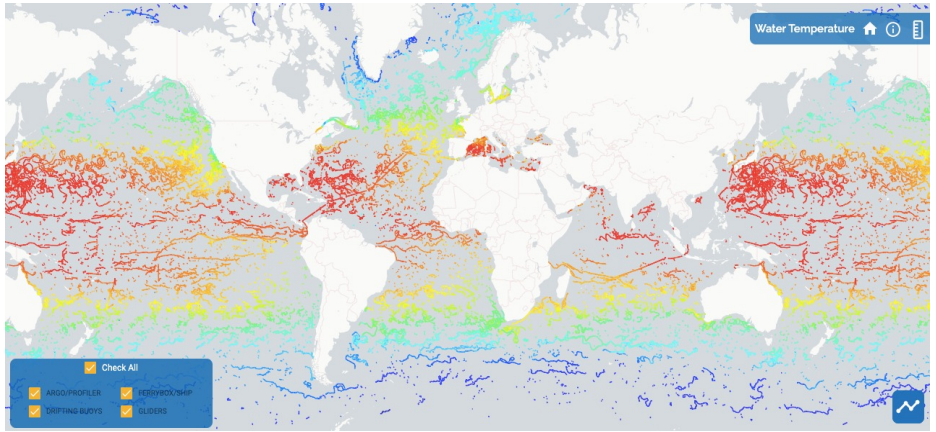
Salinity observations play a role in monitoring the global water cycle, ocean density, mass, and more. These in-situ data are essential inputs for many ocean models, for validating and calibrating remote sensing observations, and for understanding the ocean's role in the global climate system.

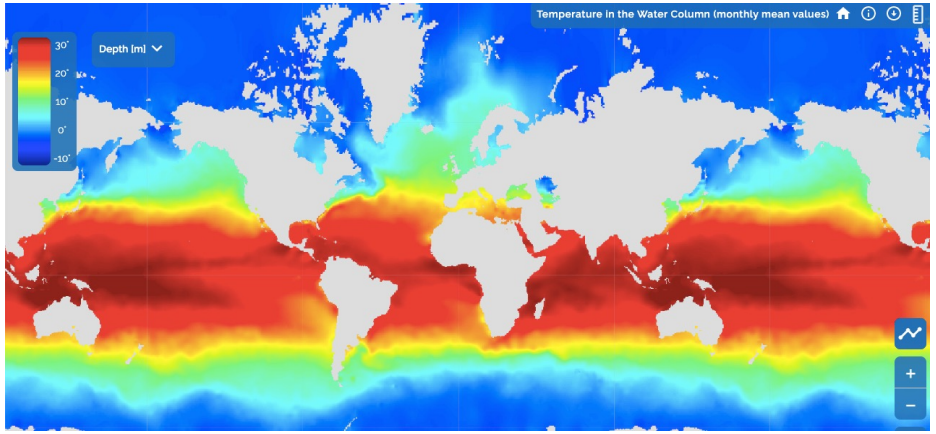
EMODnet Physics provides in-situ observations from various catalogues, both European (such as SeaDataNet, CMS, ICES DB, etc.) and international (including MEOP, SOOS, DOOS, IOOS, etc.), linking different platforms with a wide range of spatial and temporal scales.

The EMODnet Physics data collection includes moorings, which offer high temporal resolution at specific locations but have limited spatial resolution due to array density; gliders and tagged animals that provide higher spatial resolution depending on endurance and instrument characteristics; profiling floats (ARGO) that deliver temperature profiles typically from 0-2,000 meters; casts from ship-based Conductivity-Temperature-Depth (CTD) observations along research voyage tracks, providing temperature observations throughout the water column; Expendable probes (xBT) dropped from a network of volunteer commercial vessels along major shipping routes, observing temperature to several hundred meters depth on a roughly seasonal repeat schedule; and surface loads and ferrybox repeated transects, which offer high-resolution sea surface temperature datasets.

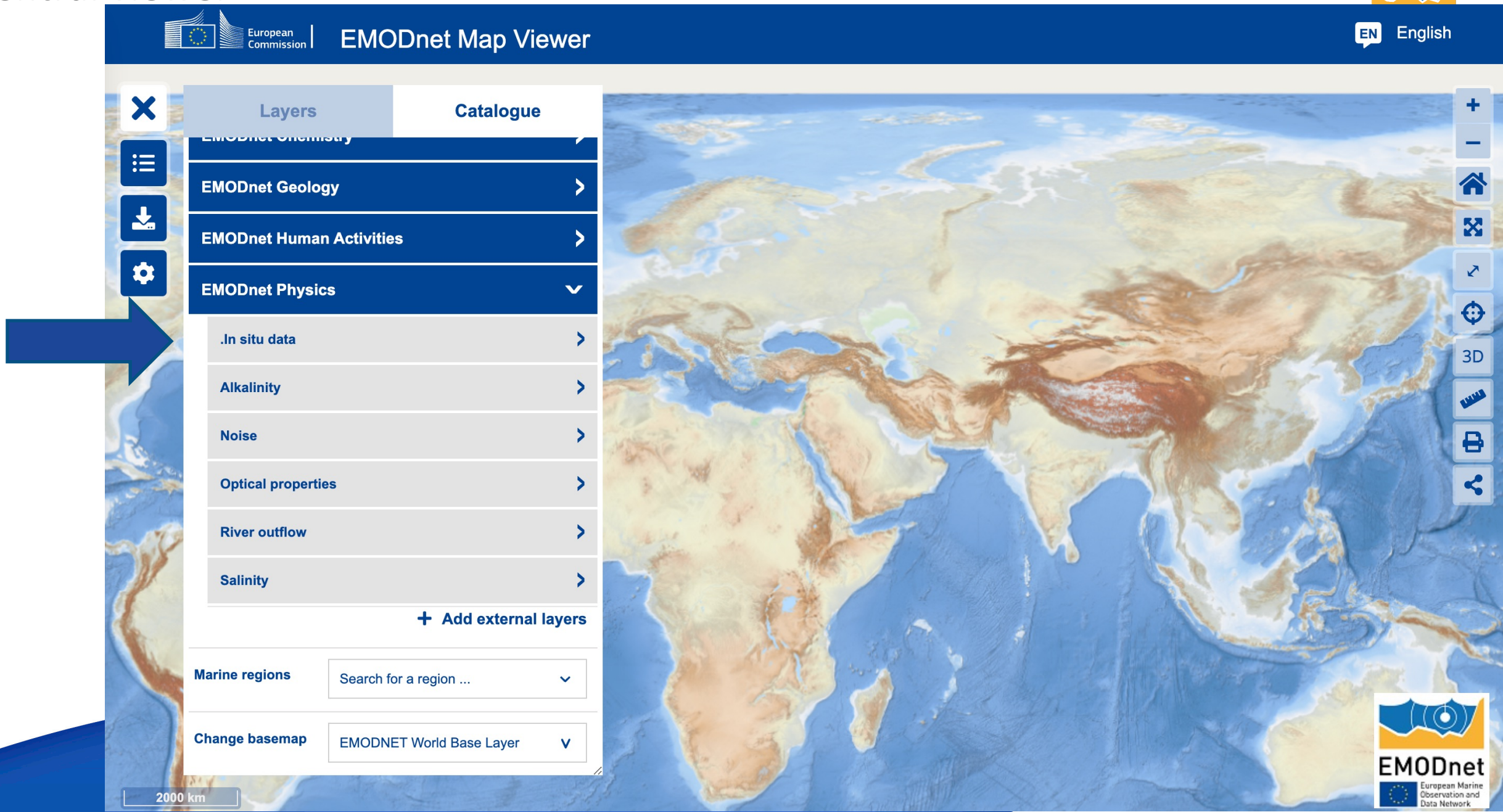
Using these *in situ* data, it is possible to analyze trends, create maps, and generate gridded data products. Examples include the CORA (Coriolis Ocean Dataset for Reanalysis), developed by IFREMER for the Copernicus Marine Service and regularly updated (annually), and the SeaDataNet Regional Climatology products, developed by SeaDataNet partners using DIVA software and periodically updated.

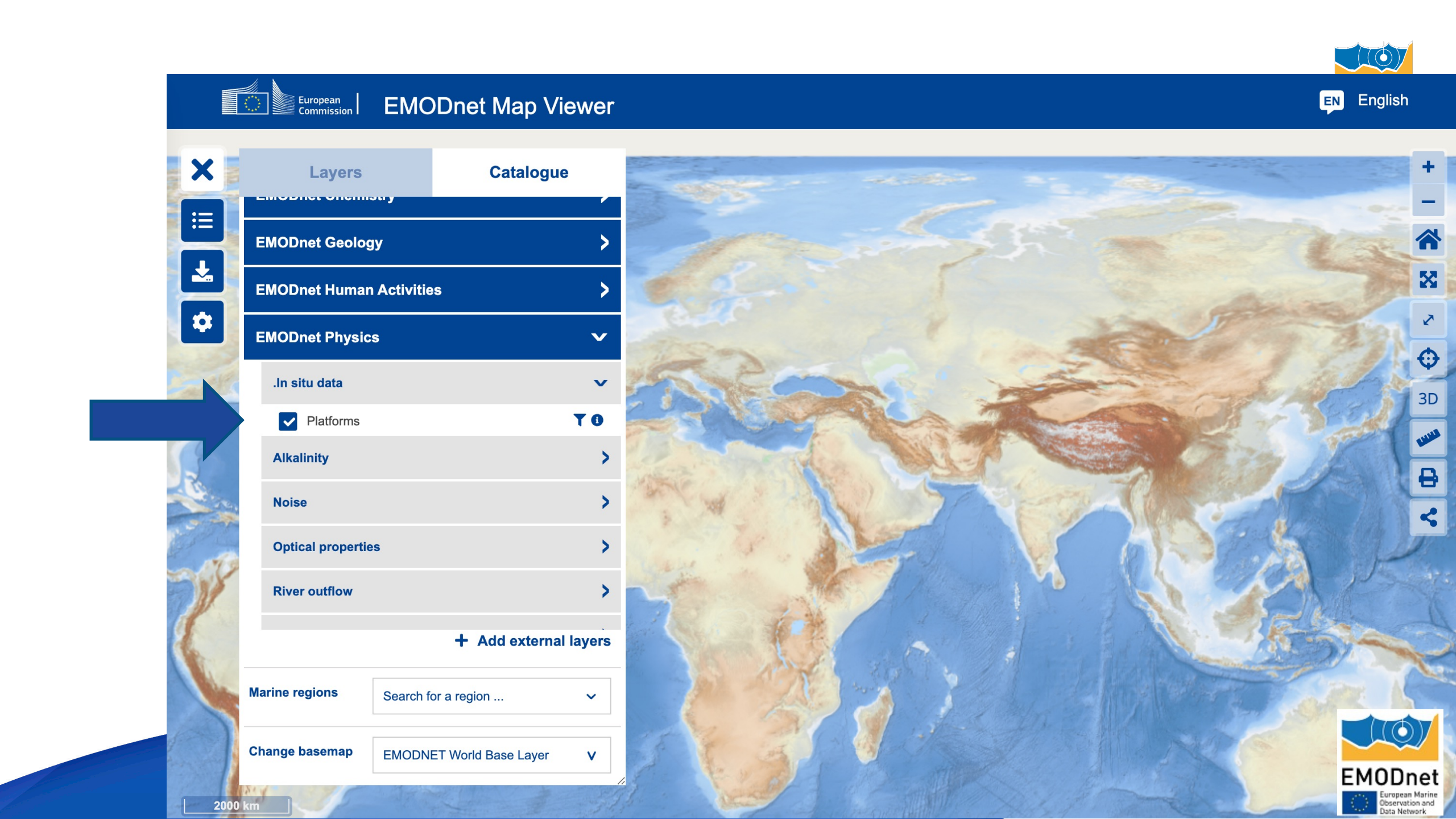
EMODnet
European Marine Observation and Data Network

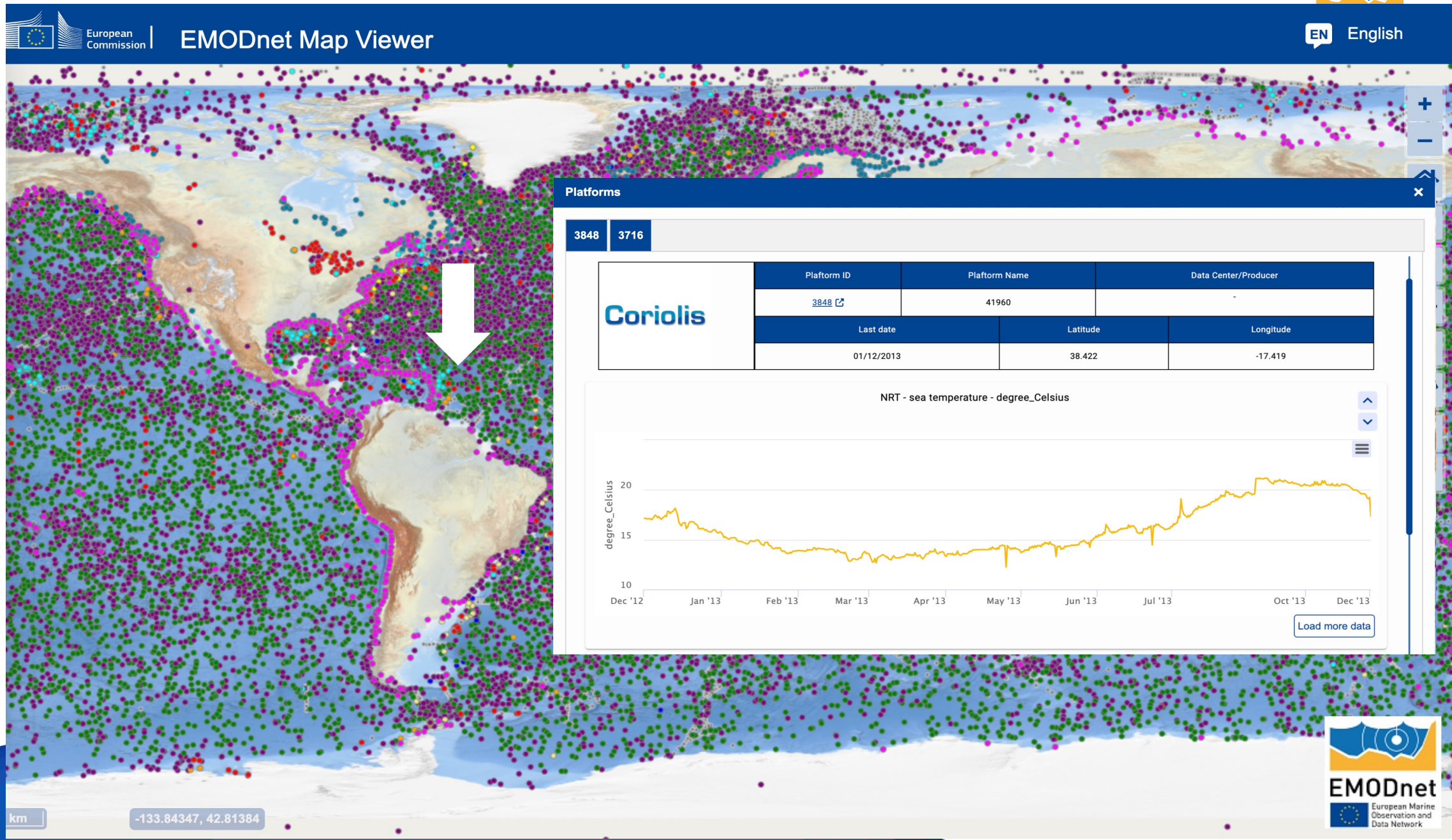




Central viewer




European Commission
EMODnet Map Viewer
EN English
Layers
Catalogue
EMODnet Geology
EMODnet Human Activities
EMODnet Physics
.In situ data
Platforms
Alkalinity
Noise
Optical properties
River outflow
Add external layers
Marine regions
Search for a region ...
Change basemap
EMODNET World Base Layer
3D
2000 km
EMODnet
European Marine Observation and Data Network


European Commission
EMODnet Map Viewer
EN English
Platforms
3848
3716
Coriolis
Platform ID
Platform Name
Data Center/Producer
3848
41960
-
Last date
Latitude
Longitude
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-17.419
NRT - sea temperature - degree_Celsius
degree_Celsius
20
15
10
Dec '12
Jan '13
Feb '13
Mar '13
Apr '13
May '13
Jun '13
Jul '13
Oct '13
Dec '13
Load more data
km
-133.84347, 42.81384
EMODnet
European Marine Observation and Data Network

Applicable standards

Metadata	Use known controlled vocabularies	Stations: OceanOPS (WMO) Parameters, Units: SeaDataNet P09, P07, P01:P02; P06; * Organizations: SeaDataNet EDMO Projects: OceanOPS, EDMERP/Cordis DB When, Where: ISO 8601, WGS84
Dataset	The datasets should be identified by a DOI, persistent identifier for object and ISO standard.	DOI publishers in Europe are ZENODO (https://help.zenodo.org/) for any research fields (and including data, papers, software …) and SEANOE (https://www.seanoe.org/html/doi-complementarity -with-databases.htm) for marine research data
Data Format	The netCDF CF (v1.6 or greater) format is preferred as it is commonly used by the marine community and by the data integrators for in situ data as well as for satellite and modelling ones. csv, txt, GRIIB, HD5 are ok	Data model is important
Access protocol	standardised communication protocols	○ ftp, for direct download of data ○ https, for implementation of ERDDAP server that allows access to discrete data (as in situ ones)
Licence	When possible, to give open and free access to the data. Note that this access can be done through authorisation or authentication if needed. "As open as possible, restricted if necessary"	"Creative Commons" (CC): EC Open Science --> metadata CC0, data CC-BY. CC-BY - credit must be given to creator) should be preferred.
Principal Investigators	actors associated to the data	Persistent digital identifier or ORCID code https://orcid.org/

** working on setting up a dedicated NVS voc → P33*

EMODnet Physics

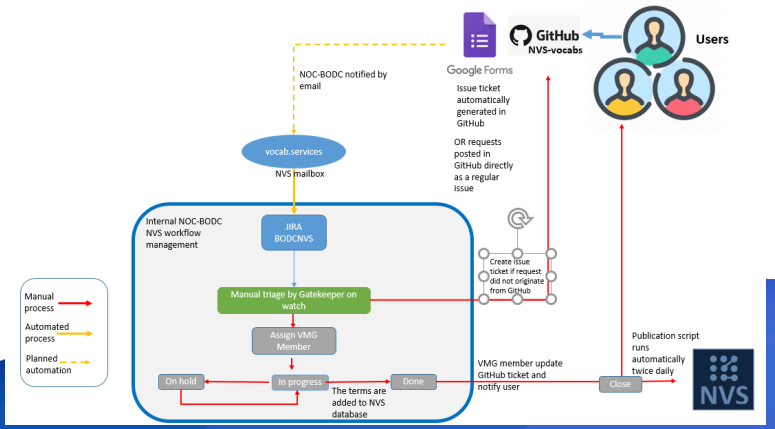
NERC Vocabulary Server (NVS)

- Parameters: P01(SDN), P07(CF), P09(MEDATLAS)
- Parameters Group/Concept: P02, [P33 (Physics)]
- Units: P06
- Platforms: L06 (L22)

platform specific vocabularies
- ARGO: R03
- Gliders: OG1

more on:
- https://vocab.nerc.ac.uk/collection/

made by VocPrez for NVS



NERC Environmental Data Service

National Oceanography Centre — British Oceanographic Data Centre

The NERC Vocabulary Server (NVS)

Service Status

NVS Home | Vocabularies | Thesauri | Search NVS | SPARQL | Other Tools | About NVS

Vocabulary

BODC Parameter Usage Vocabulary

URI	http://vocab.nerc.ac.uk/collection/P01/current/
Description	Terms built using the BODC parameter semantic model designed to describe individual measured phenomena. May be used to mark up sets of data such as a NetCDF array or spreadsheet column. Units must be specified when using a P01 code. The P06 unit that is linked to individual P01 in the NVS is the one used in BODC's systems but external users can use any appropriate units.
Creator	British Oceanographic Data Centre
Modified	2024-02-09
Version Info	1208
Identifier	P01

Alternate Formats

Download other formats for this page:

RDF/XML | Turtle | JSON-LD

Alternate Profiles

Other views of this page:

Alternate Profiles ?

I-ADOPT view ?

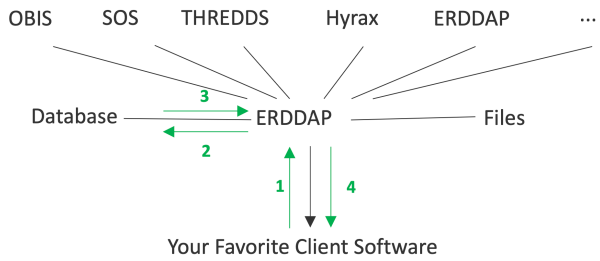
PUV view ?

ID ↑	Preferred Label ↑	Definition ↑	Date ↑
SAGEMSFM	14C age of Foraminiferida (ITIS: 44030: WoRMS 22528) [Subcomponent: tests] in sediment by picking and accelerator mass spectrometry	Accelerated mass spectrometry on picked tests	2008-10-16
SAGEMCFM	14C age of Foraminiferida (ITIS: 44030: WoRMS 22528) [Subcomponent: tests] in sediment by picking and accelerator mass spectrometry and correction after Stuiver and Reimer	Accelerated mass spectrometry on picked tests then Stuiver and Reimer correction	2018-01-16
SAGEMSGB	14C age of Globigerina bulloides (ITIS: 45797: WoRMS 113434) [Subcomponent: tests] in sediment by picking and accelerator mass spectrometry	Accelerated mass spectrometry on picked tests	2008-10-16
SAGEMCGB	14C age of Globigerina bulloides (ITIS: 45797: WoRMS 113434) [Subcomponent: tests] in sediment by picking and accelerator mass spectrometry and correction after	Accelerated mass spectrometry on picked tests then Stuiver and Reimer correction	2018-01-16

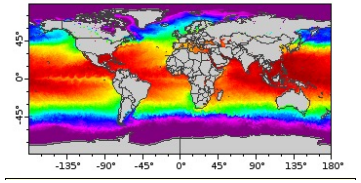
EMODnet Physics

ERDDAP

- Open source (mediated) project
- Improve each dataset's metadata.
- Generate ISO 19115 metadata.
- Standardize the format of time data.
- Easy unified user search for datasets.
- Standard way to request data
- Both Gridded and tabular data
- Let users specify the response file format.
- **Supports federation (no need to move data)!**
- …
- Adopted/suggested by GOOS OCG Data Management



Web page with forms

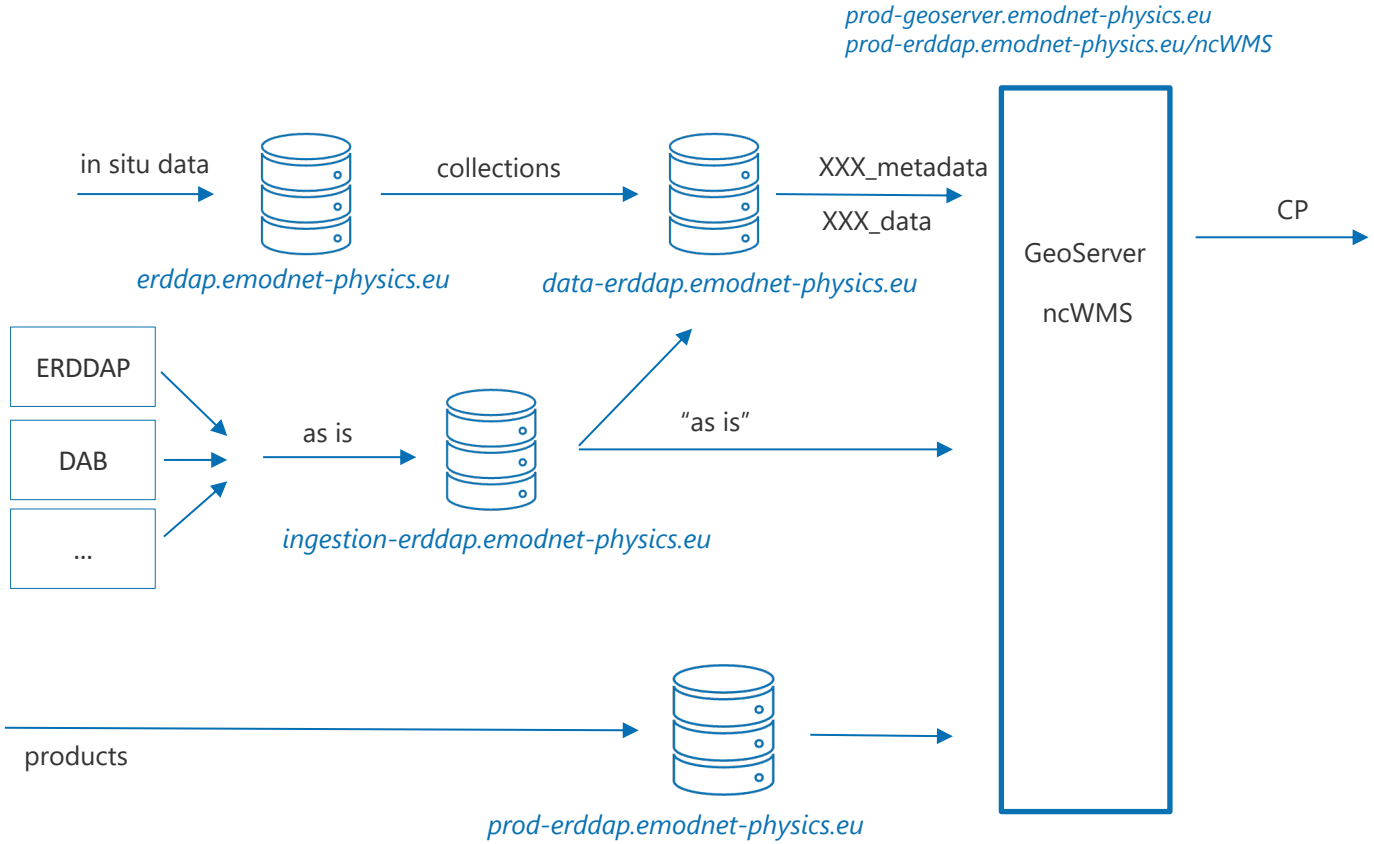


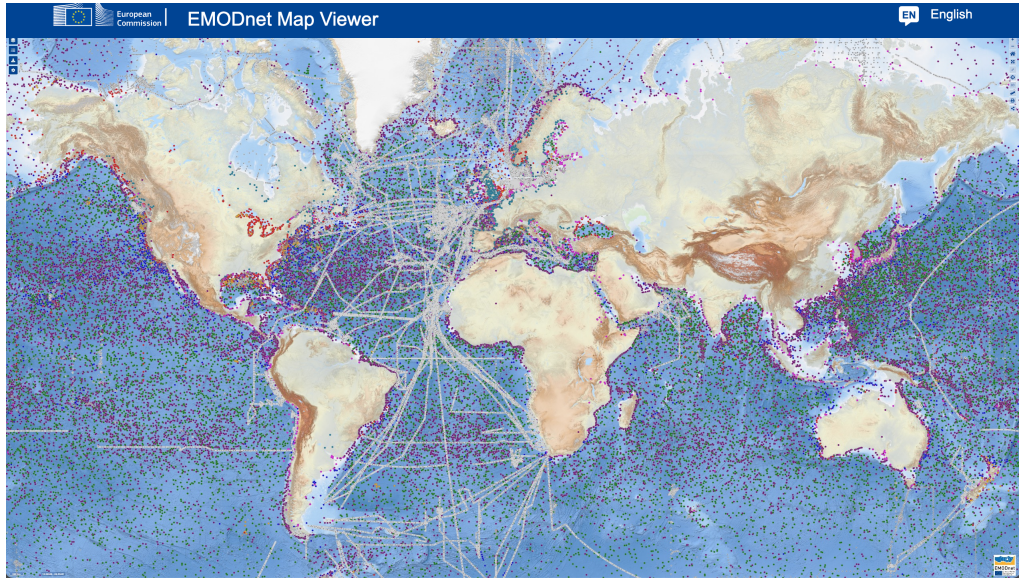
RESTful Web Services
a single request URL specifies an entire request

time	latitude	longitude	analysed_sst
UTC	degrees_north	degrees_east	degree_C
2016-07-01T09:00:00Z	24.0	-90.0	30.288
2016-07-01T09:00:00Z	24.0	-89.99	30.342
2016-07-01T09:00:00Z	24.0	-89.98	30.401
2016-07-01T09:00:00Z	24.0	-89.97	30.451
2016-07-01T09:00:00Z	24.0	-89.96	30.487000000000002
2016-07-01T09:00:00Z	24.0	-89.95	30.511
2016-07-01T09:00:00Z	24.0	-89.94	30.526
2016-07-01T09:00:00Z	24.0	-89.93	30.539
2016-07-01T09:00:00Z	24.0	-89.92	30.549
2016-07-01T09:00:00Z	24.0	-89.91	30.55
2016-07-01T09:00:00Z	24.0	-89.9	30.539
2016-07-01T09:00:00Z	24.0	-89.89	30.522
2016-07-01T09:00:00Z	24.0	-89.88	30.503
2016-07-01T09:00:00Z	24.0	-89.87	30.489
2016-07-01T09:00:00Z	24.0	-89.86	30.484
2016-07-01T09:00:00Z	24.0	-89.85	30.486

EMODnet Physics

Simplified Architecture Physics



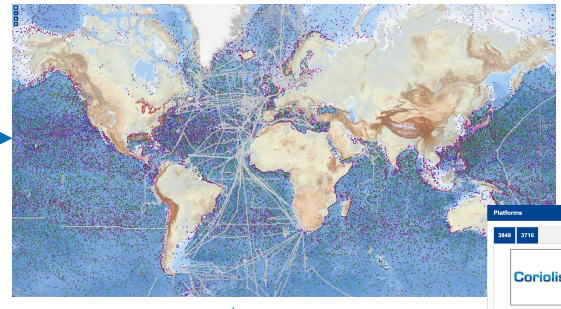


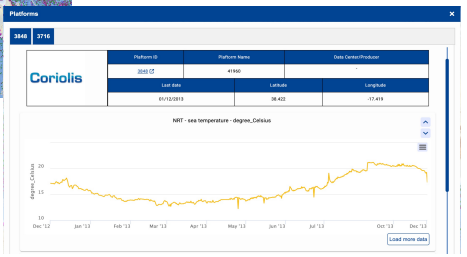
EMODnet Physics

GroupParameter metadata → data collection → P33: Salinity

Parameter metadata
- timeseries → data collection
- profile → data collection

→ P01: PR_PSAL
P01: TS_PSAL
P01: PR_CNDC
P01: TS_CNDC
P01: TS_SVEL





ERDDAP > Search

Do a Full Text Search for Datasets:
ERD_EP_TS_RVFL_NRT Search

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

Grid DAP Data	Sub-set	Table DAP Data	Make A Graph	WMS	Source Data Files	Title	Sum-mary	FGDC, ISO, Metadata	Back-ground Info	RSS	E mail	Institution	Dataset ID
	set	data	graph			EMODnet Physics - Collection of river flow rate (RVFL) TimeSeries - MultiPointTimeSeriesObservation		F I M	background	RSS		EMODnet Physics	ERD_EP_TS_RVFL_NRT
	set	data	graph		files	EMODnet Physics - Collection of river flow rate (RVFL) TimeSeries - MultiPointTimeSeriesObservation - METADATA		F I M	background	RSS		EMODnet Physics	ERD_EP_TS_RVFL_NRT_METADATA

The information in the table above is also available in other file formats (.csv, .htmlTable, .itx, .json, .jsonlCSV1, .jsonlCSV, .jsonlKVP, .mat, .nc, .nccsv, .tsv, .xhtml) via a RESTful web service.

ArnhemNederrijnlek	ArnhemNederrijnlek	51.97523880004883	5.912320137023926	timeseries	SDN:P01::RFDSCH01,SDI
ArtibaiBerriatua	ArtibaiBerriatua	43.30622	-2.4746892	timeseries	SDN:P01::RFDSCH01,SDI
Asbro3Viskan	Asbro3Viskan	57.2397	12.3088	timeseries	SDN:P01::RFDSCH01
AsuaSangroniz	AsuaSangroniz	43.28903579711914	-2.929565668106079	timeseries	SDN:P01::RFDSCH01
Atrynevatn	Atrynevatn	61.927	6.851	timeSeries	SDN:P01::RFDSCH01
AubagneHuveaune	AubagneHuveaune	43.28953170776367	5.5569000244140625	timeseries	SDN:P01::RFDSCH01
AuchendraneDoon	AuchendraneDoon	55.40998	-4.6270547	timeseries	SDN:P01::RFDSCH01
AunvatnNordfolda	AunvatnNordfolda	64.88863372802734	12.477029800415039	timeseries	SDN:P01::RFDSCH01
AustinsbridgeDart	AustinsbridgeDart	50.478523	-3.761327	timeseries	SDN:P01::RFDSCH01
AuxanglaisAnglais	AuxanglaisAnglais	49.32278060913086	-68.15718841552734	timeseries	SDN:P01::RFDSCH01
AuxfeuillesLeaf	AuxfeuillesLeaf	58.27777862548828	-71.3116683959961	timeseries	SDN:P01::RFDSCH01
AvatnGjengedalsvassdraget	AvatnGjengedalsvassdraget	61.71940994262695	5.921299934387207	timeseries	SDN:P01::RFDSCH01
AveAlbufeiradeguilhofrei	AveAlbufeiradeguilhofrei	41.585	-8.138	timeseries	SDN:P01::RFDSCH01
AvochieDeveron	AvochieDeveron	57.505646	-2.782378	timeseries	SDN:P01::RFDSCH01

PLATFORMCODE	time	TIME_QC	depth	DEPTH_QC	latitude	longitude	POSITION_QC	RVFL	RVI
	UTC	1	m	1	degrees_north	degrees_east	1	m3/s	
AbromollaVegea	2023-06-11T23:00:00Z		0.0	0	56.07419967651367	12.974499702453613	0	0.10199999809265137	
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AbromollaVegea	2023-07-08T23:00:00Z		0.0	0	56.07419967651367	12.974499702453613	0	0.10599999874830246	
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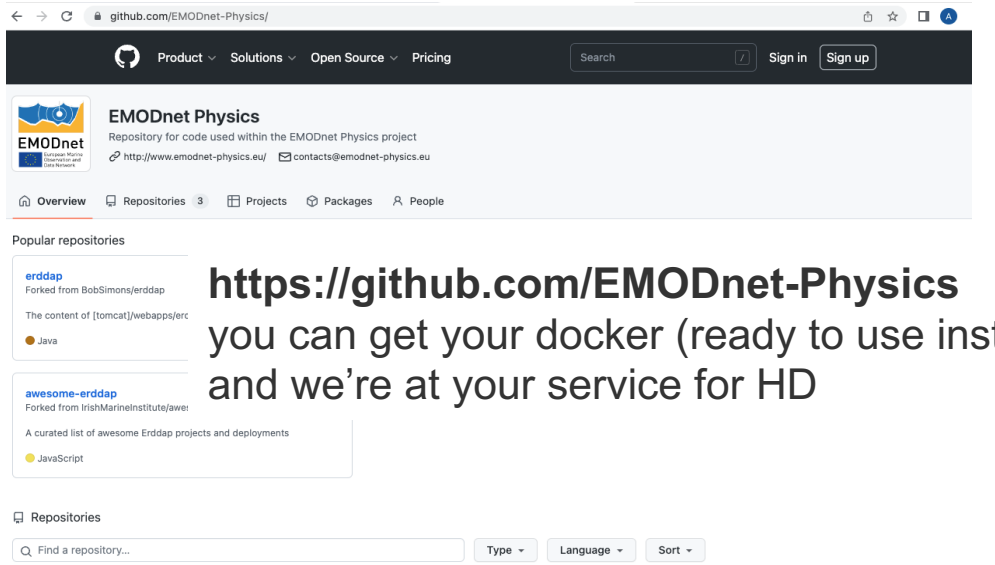
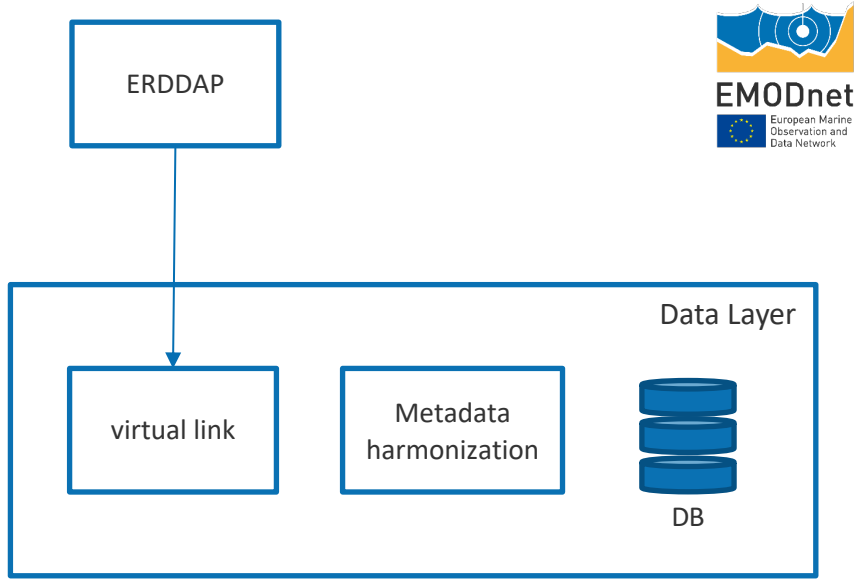
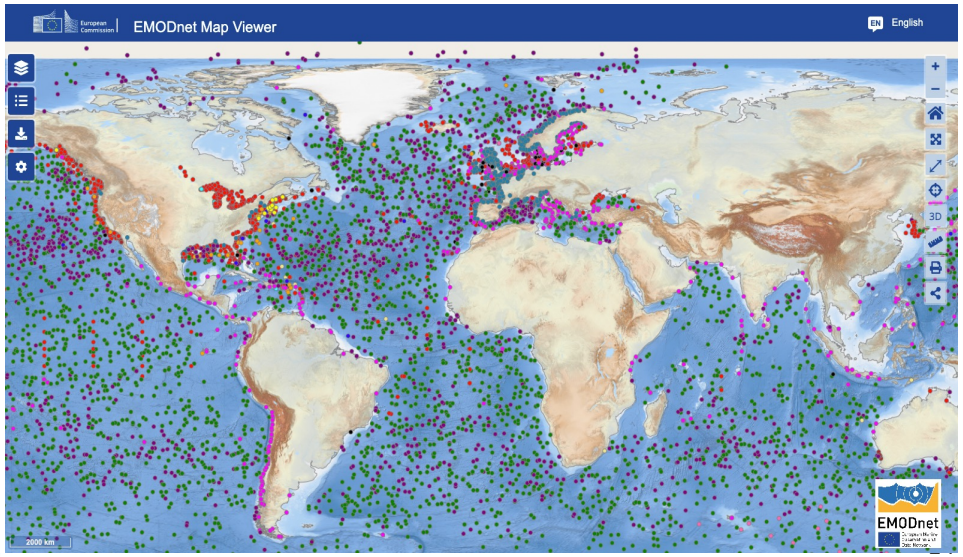
AbromollaVegea	2023-07-10T23:00:00Z		0.0	0	56.07419967651367	12.974499702453613	0	0.12399999797344208	
AbromollaVegea	2023-07-11T00:00:00Z		0.0	0	56.07419967651367	12.974499702453613	0	0.12399999797344208	
AbromollaVegea	2023-07-12T00:00:00Z		0.0	0	56.07419967651367	12.974499702453613	0	0.25699999928474426	
AbromollaVegea	2023-07-12T23:00:00Z		0.0	0	56.07419967651367	12.974499702453613	0	0.6359999775886536	
AbromollaVegea	2023-07-13T00:00:00Z		0.0	0	56.07419967651367	12.974499702453613	0	0.6359999775886536	

How to connect?



https://github.com/EMODnet-Physics
you can get your docker (ready to use installation package)
and we're at your service for HD

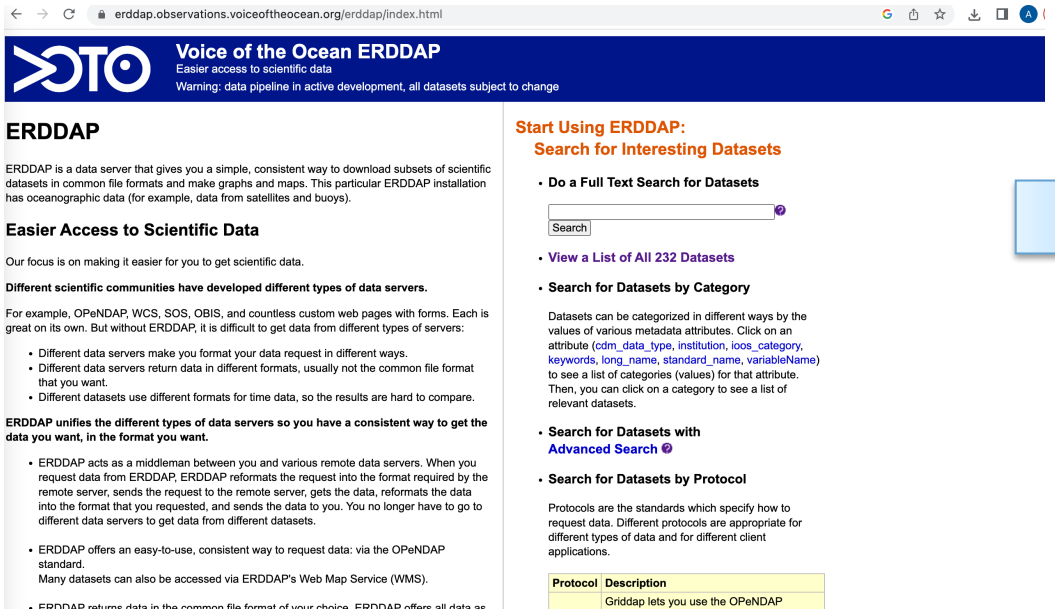


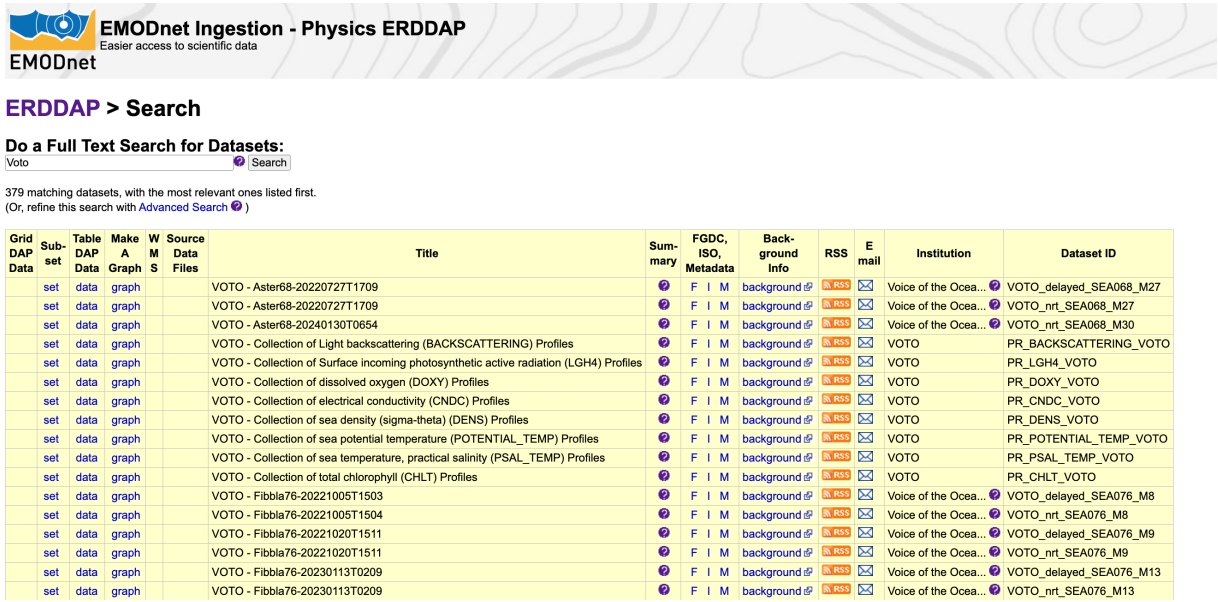


benefit:

- mapping/inventory
- no duplicates
- no several copies of the same data

original data: ingestion-data.emodnet-physics.eu





working on platform collections (e.g. CTD)

Grid DAP Data	Sub-set	Table DAP Data	Make A Graph	WMS	Source Data Files	Title	Su ma
	set	data	graph			EMODnet Physics - CTD - In situ - Collection of (PSAL_TEMP) Profile - MultiPointProfileObservation	
		data	graph		files	EMODnet Physics - Collection of platforms metadata ctd	

MIC – Marine In situ Collaboration and Coordination

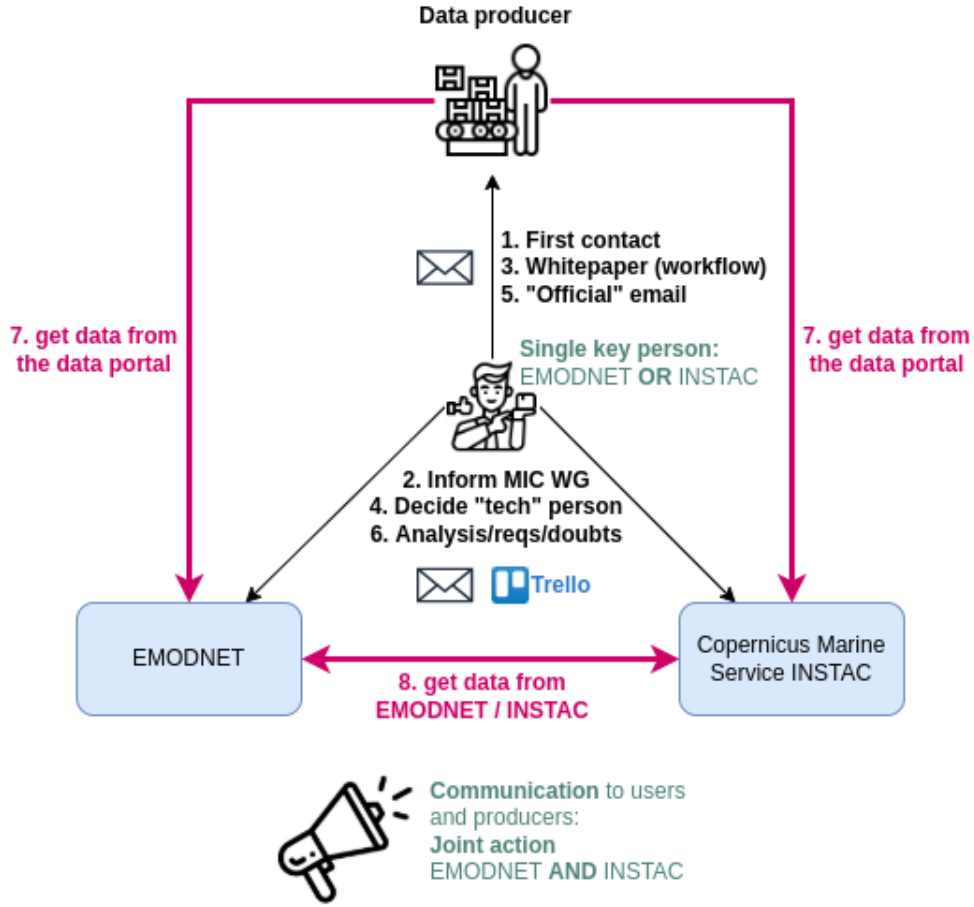
Goals

- Operate a common ingestion procedure for the operational oceanographic data and serve both EMODnet and Copernicus Marine

- Implement and promote standards and best practices
  - FAIR and open data
  - metadata and data formats and conventions
  - Data quality check and flag
  - Machine-to-machine
  - training and support

- Bring together experts from Copernicus Marine Service INS TAC, EMODnet Physics, EMODnet Chemistry, EuroGOOS, SeaDataNet, OceanOPS

- Official working group since 2022



EMODnet

European Marine Observation and Data Network

emodnet.ec.europa.eu

Stay up-to-date with the latest news

The European Marine Observation and Data Network (EMODnet) is financed by the European Union under Regulation (EU) 2021/1139 of the European Parliament and of the Council of 7 July 2021 establishing the European Maritime, Fisheries and Aquaculture Fund.