EMODnet

European Marine Observation and Data Network

Data and data product portfolio

August 2019

This document has been produced and designed by the EMODnet Secretariat and the Flanders Marine Institute (VLIZ), with special contribution from Nathalie Tonné (EMODnet Secretariat) and Paula Oset García (VLIZ).

All the maps displayed in this portfolio were obtained through the web services provided by the EMODnet thematic portals. Where data and data products are produced by, or in collaboration with, other organisations and initiatives the logos are shown.

The EMODnet portfolio aims to provide a clear and concise overview of the data and data products offered by the seven EMODnet thematic portals. It is a living document that will be updated regularly.

This version was last updated in August 2019,.
Acknowledgement: EMODnet Secretariat and Flanders Marine Institute (2019). EMODnet Data and data product portfolio. Available at http://www.emodnet.eu/data-portfolio

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Key | Data and data products categories

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BATHYMETRY

Understanding the topography of the European seas

Parameters and data formats

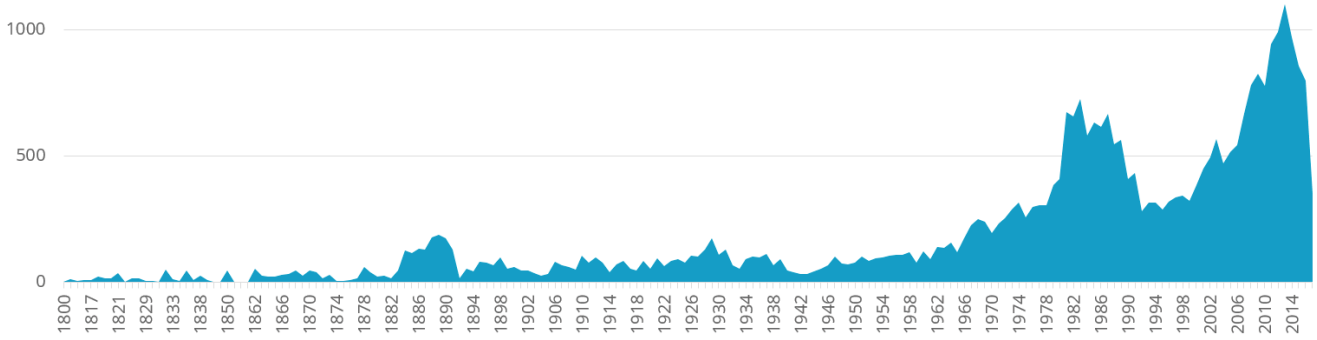
L3

Parameter category
Bathymetry and elevation

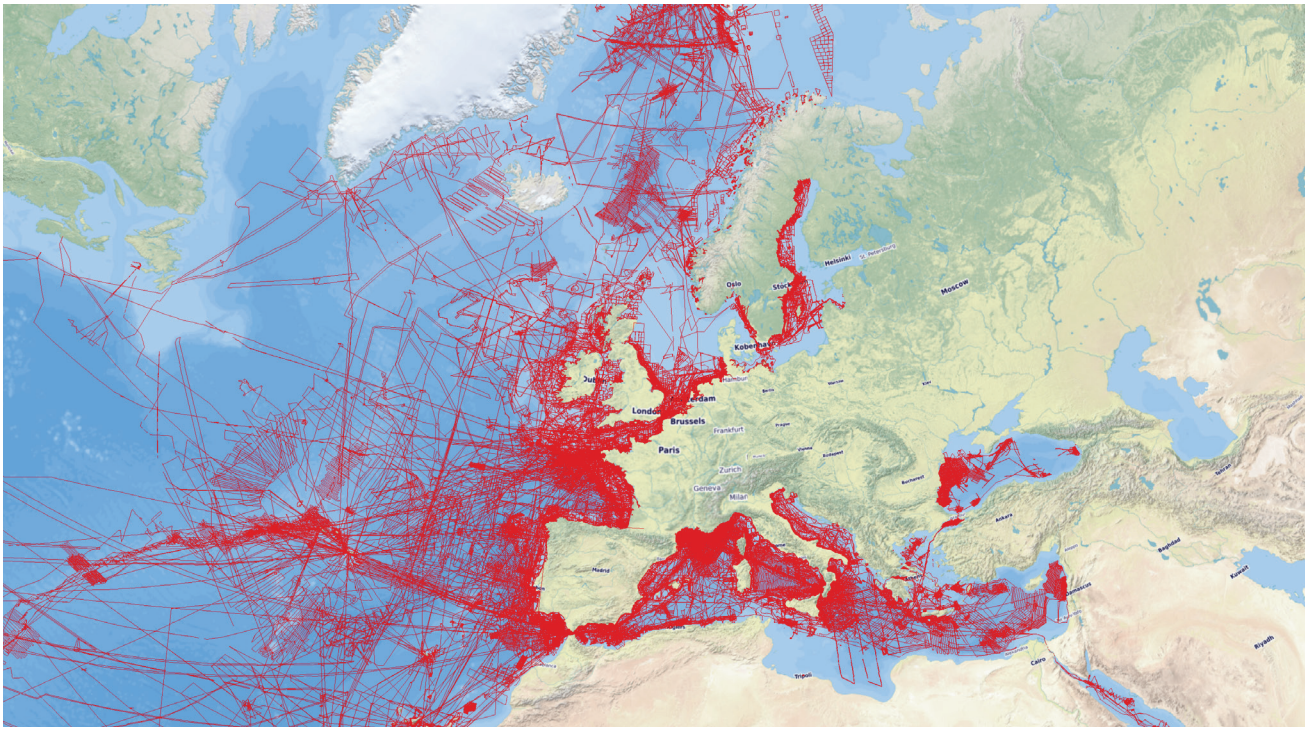
Data formats
BAG, XYZ, SeaDataNet ODV, GeoTiff, NetCDF

Coverage and resolution

Temporal coverage: number of datasets per year (1816-2018).

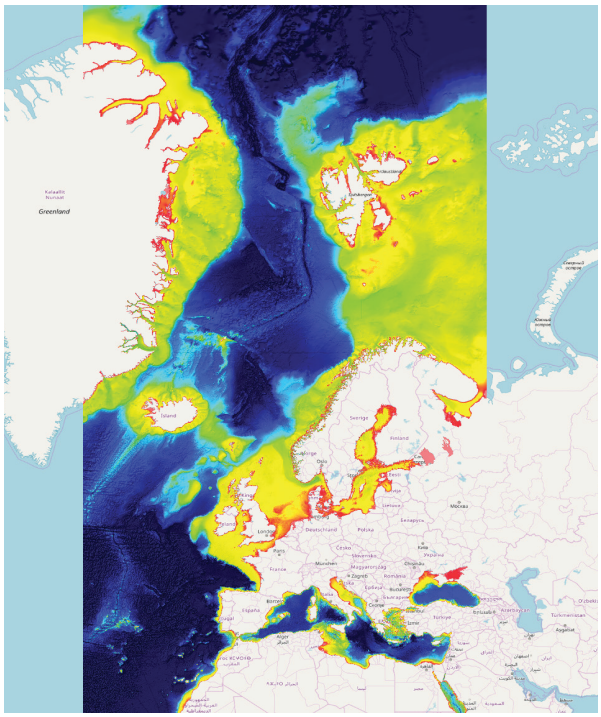


Spatial coverage



Map indicating the tracks of bathymetric surveys from which datasets have been selected and processed as input for building the overall EMODnet Digital Terrain Model (DTM). The metadata and survey data are gathered from European originators: national hydrographic services, research institutes, and companies. Their coverage goes beyond European waters as scientists collect bathymetry on a global scale.

Digital Terrain Model (DTM)

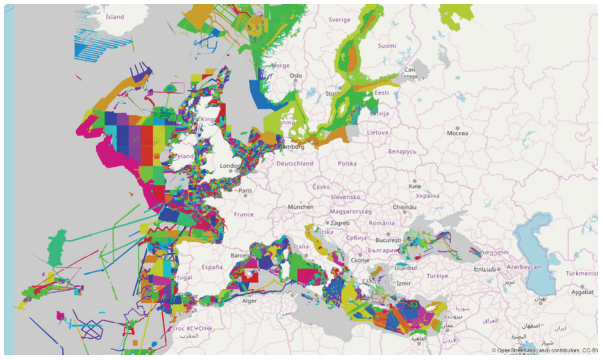


L5

EMODnet Bathymetry Digital Terrain Model (DTM) - version 2018.

- Temporal coverage: 1816 – 2018
- Spatial resolution: DTM grid 1/16 x 1/16 arc minute (circa 115 x 115 m)
- Available to download as: ESRI ASCII, EMODnet CSV, RGB GeoTIFF, NetCDF (CF), SD and XYZ
- Web services: WMS, WMTS, WFS, and WCS
- Based upon circa 9.400 bathymetric surveys, composite DTMs, and Satellite Derived Bathymetry datasets

Source references



L4

Layer containing the data sources used in the construction of the DTM.

Contains direct links to the CDI Data Discovery and Access service for survey datasets and the Sextant Catalogue service for composite DTMs and Satellite Derived Bathymetry data products. These services give metadata, and the CDI Service also facilitates requesting access to survey datasets.

- Web services: WMS, WFS

Depth contours

L5

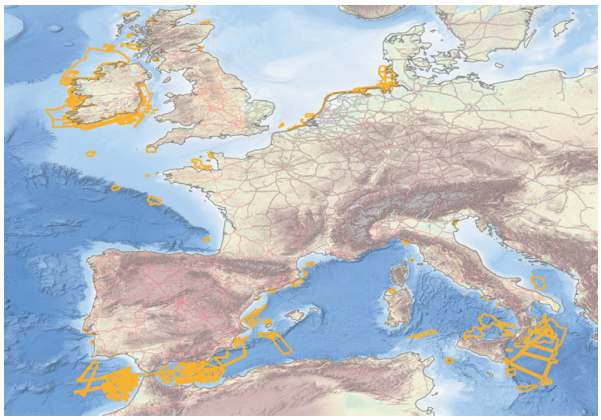
Contours based on the average depth. The contours are shown for the following depths: 50, 100, 200, 500, 1000, 2000, and 5000 meter.

- Web services: WMS, WFS

BATHYMETRY

Understanding the topography of the European seas

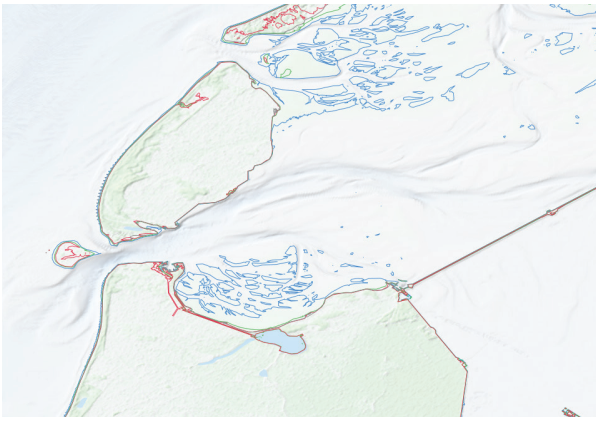
High-resolution DTMs



L5

Layer in the Bathymetry Viewing service containing circa 190 High Resolution DTMs that have been generated by data providers. The resolution of HR-DTMs varies between 1/32 and 1/512 arc minutes, depending on local data policy of data providers. The HR-DTM layer allows to zoom in deeper than the common DTM layer and HR-DTMs can be interrogated for metadata and downloaded as data files.

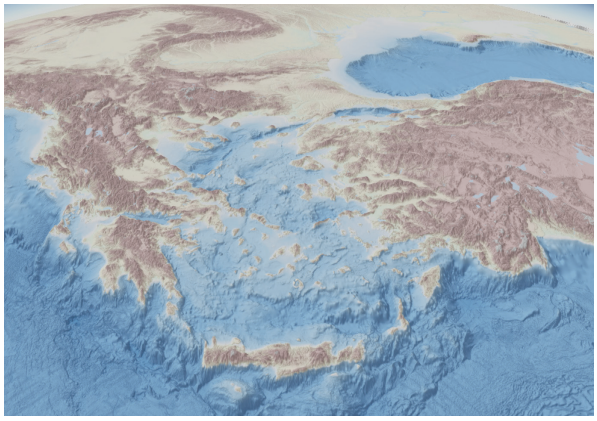
Best-estimate European digital coastlines



L5

Layer in the Bathymetry Viewing service containing best-estimate coastlines for the European seas at LAT (Lowest Astronomical Tide), MSL (Mean-Sea-Level), and MHW (Mean-High-Water). These were determined from satellite data (typically Sentinel-2 and Landsat-8) in combination with the Global Tide Surge Model (GTSM). The level of detail is bound to the resolution of the satellite sensor (e.g. 10m for Sentinel-2). These satellite derived coastlines can also be downloaded with documentation from the EMODnet Bathymetry portal.

3D-viewing of the EMODnet DTM

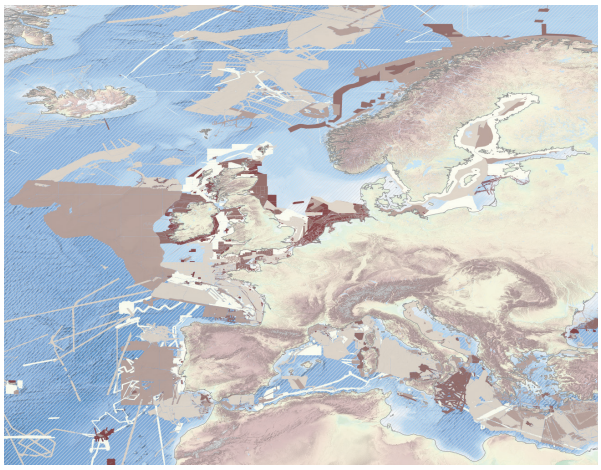


L5

Extra functionality has been added to the Bathymetry Viewing service for 3D visualiation of the latest EMODnet DTM.

Quality Index layer

L4



A new layer in the Bathymetry Viewing service, linked to the Source References layer. It gives maps of the used survey datasets by:

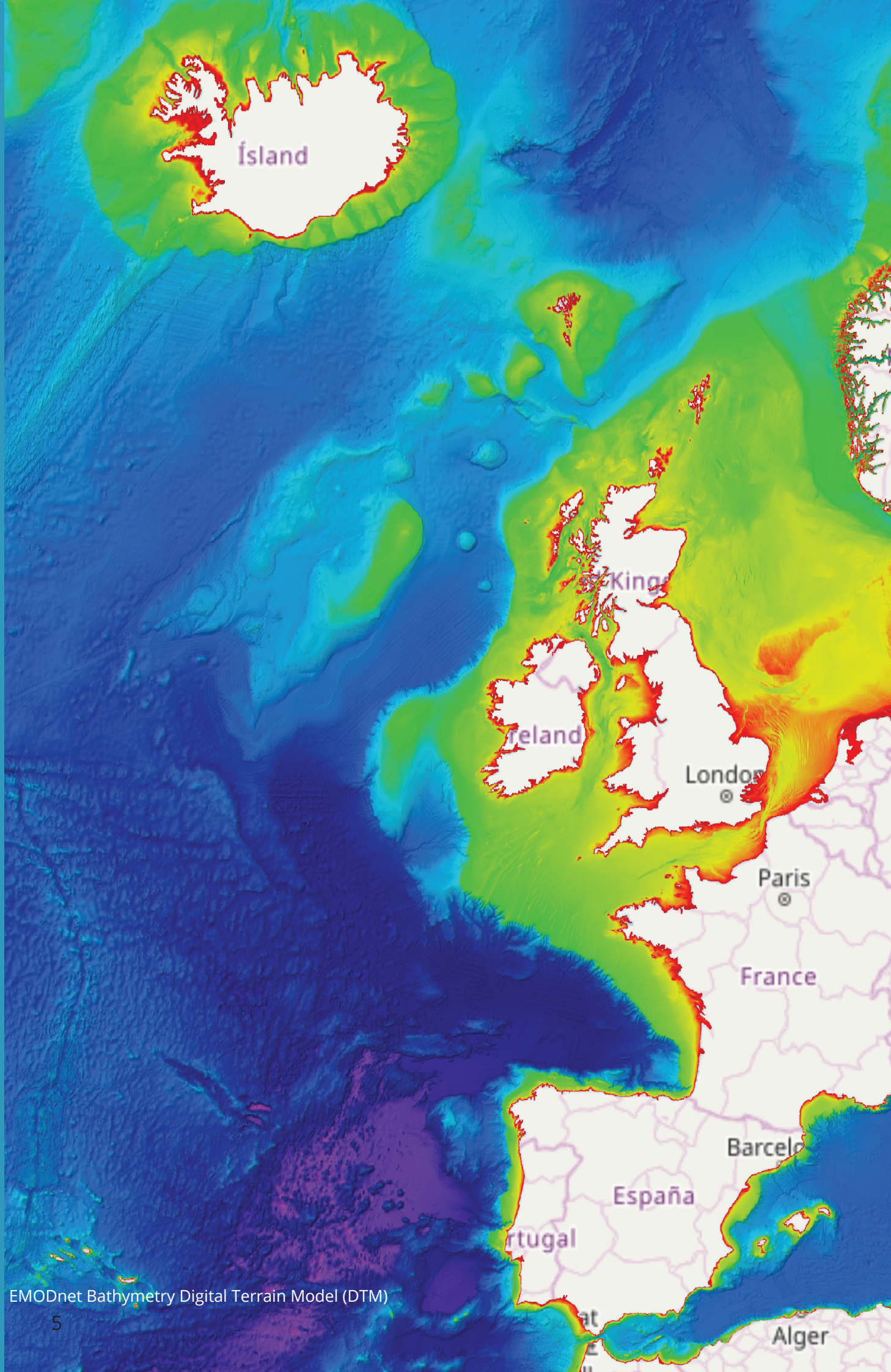
- QI_Age: provides an indication of how old the survey of DTM is (4 options)
- QI_Purpose: provides an indication of the purpose of the survey (4 options)
- QI_Vertical: an indication of the vertical accuracy (5 options)
- QI_Horizontal: an indication of the horizontal accuracy (4 options)
- Combined quality indicator

Inventory of official coastlines and baselines

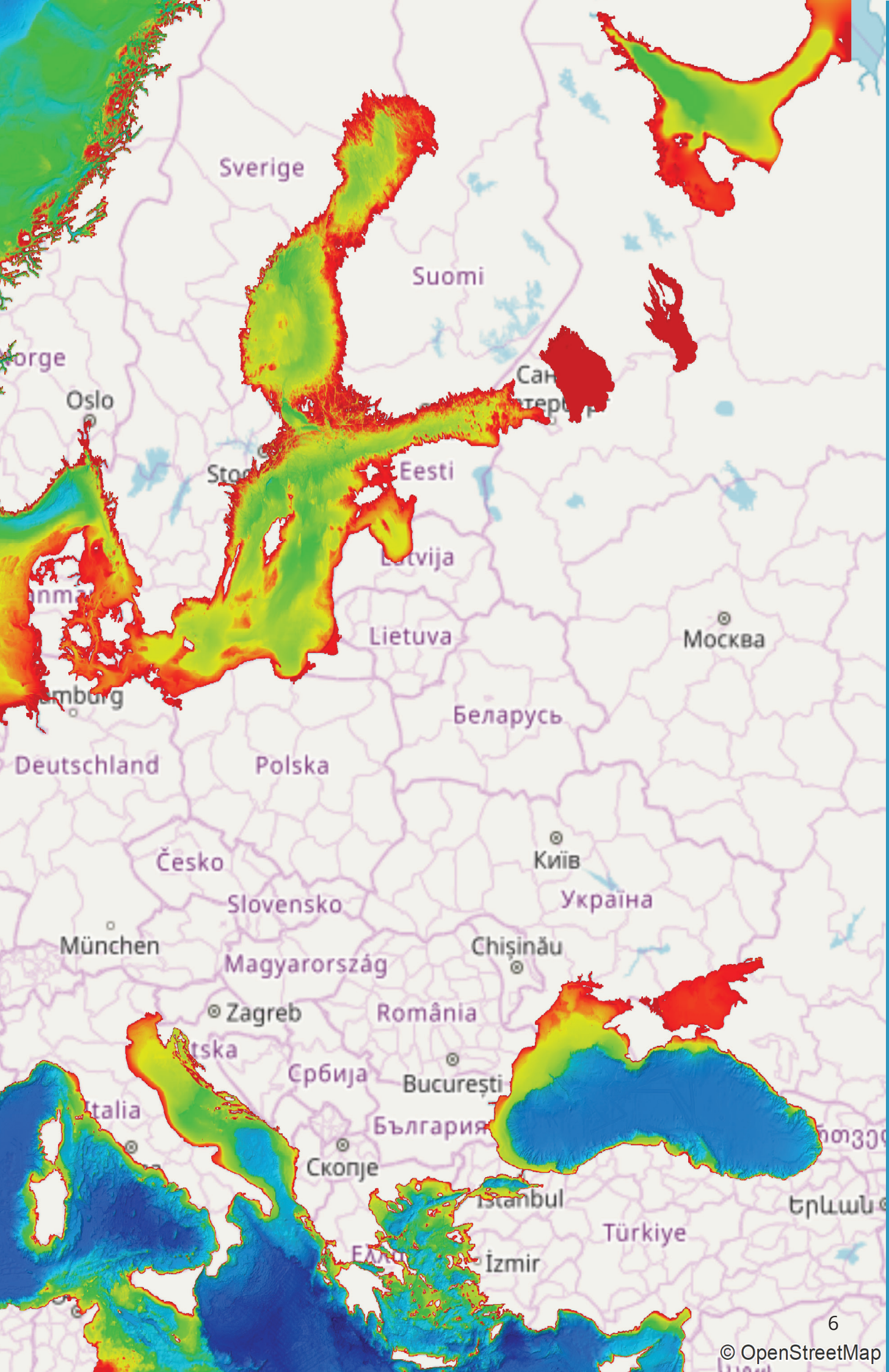
L5

An inventory and report of baseline and coastline data as collected from 21 national authorities in Europe. It describes the information available per country, the resolution, the source of the data and the institute providing/hosting the data. This can be downloaded from the EMODnet Bathymetry portal together with shapefiles of the baselines and coastlines.

More information on the data and data products of EMODnet Bathymetry can be found scanning this QR code, or at www.emodnet-bathymetry.eu.



EMODnet Bathymetry Digital Terrain Model (DTM)



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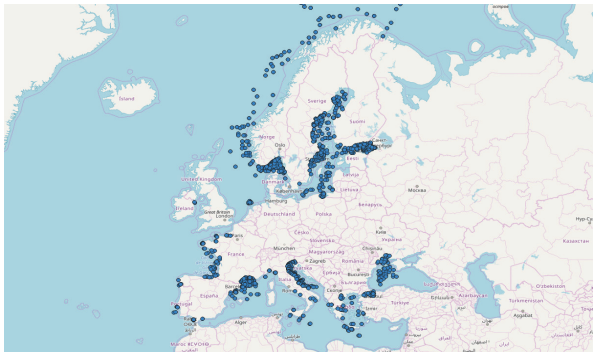
EMODnet

GEOLOGY

Discover Europe´s seabed geology

Sedimentation rates

L4

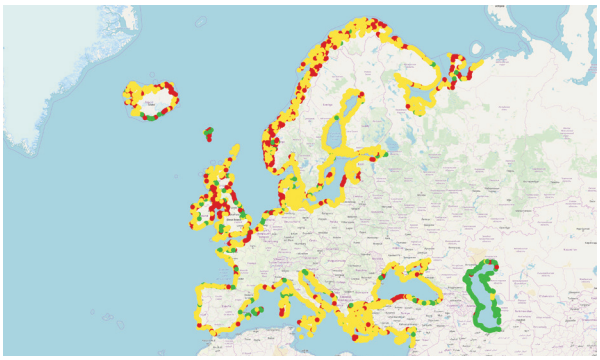


Sedimentation rate map of the European Seas. The attribute table contains sediment accumulation rates expressed in cm/year, together with sampling information.

- Available to download as: ESRI file geodatabase
- Web services: WMS, WFS

Coastal behaviour via satellite data

L5

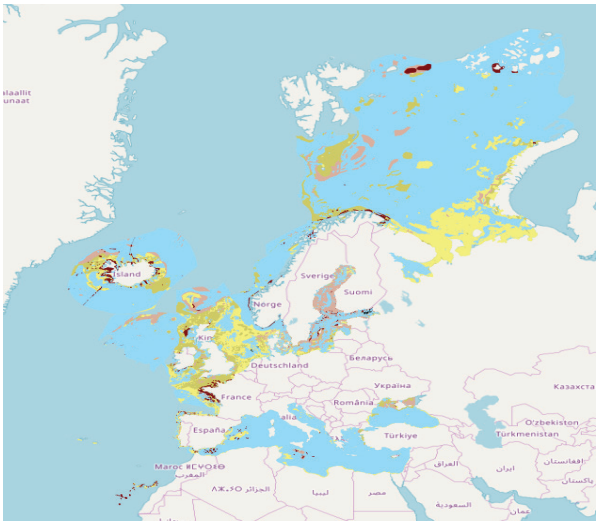


Shoreline-migration map allows users to visualise pan-European coastal behaviour for 2007-2017 at different spatial scales. Three coastal migration classes are defined – erosion, stable, and accretion – which are accompanied by the level of accuracy (e.g. estimated, confirmed, no information).

- Available to download as: GeoJSON
- Web services: WMS, WFS

Seabed substrates

L6



Multiscale maps of seabed substrates at scales 1:1M, 1:250k, 1:100k and 1:50k. The substrate classes are defined on basis of the modified Folk triangle: mud to muddy sand, sand, coarse substrate, mixed sediment, rock and boulders.

- Scale: 1/1.000.000, 1/250.000, 1/100.000, 1/50.000
- Available to download as: ESRI file geodatabase
- Web services: WMS, WFS

Seafloor (bedrock)

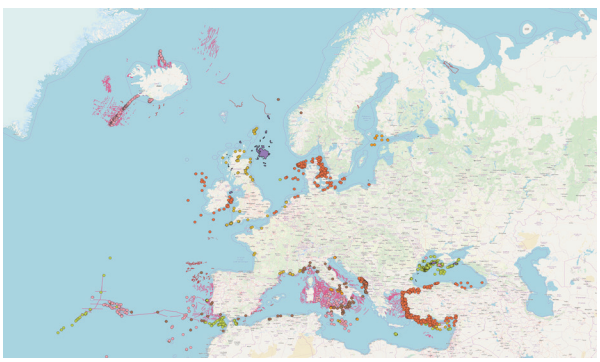
L6

Seafloor stratigraphy, lithology and fault maps representing the marine pre-Quaternary geological units, their age, structure and physical characteristics.

- Multiresolution scale: 1/100.000 – 1/5.000.000
- Available to download as: ESRI file geodatabase
- Web services: WMS, WFS

Geological event distribution

L6



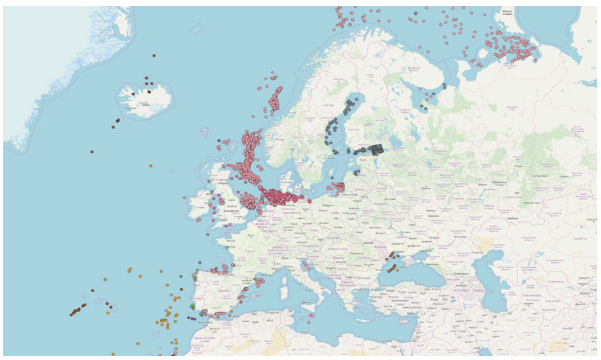
Geographical distribution of all significant geological events such as submarine landslides, fluid emissions, tectonics, earthquakes, tsunamis and volcanoes identified by their characteristics which are detailed in the attribute tables of the GIS layers.

- Multiresolution scale: 1/250.000, 1/100.000
- Available to download as: ESRI shapefile
- Web services: WMS, WFS

EMODnet | GEOLOGY

Discover Europe´s seabed geology

Mineral occurrences

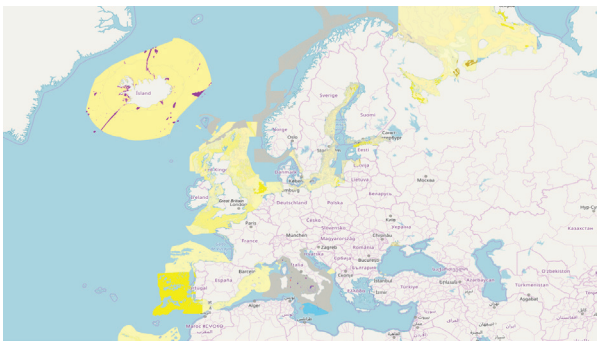


L6

Information on known marine mineral occurrences in European seas. Comprising marine aggregates, hydrocarbons, gas hydrates, placers, phosphorites, evaporites, polymetallic sulphides, polymetallic nodules, cobalt rich ferromanganese crust, metal rich sediment, and vein hosted mineralisation.

- Available to download as: ESRI shapefile
- Web services: WMS, WFS

Quaternary geological units



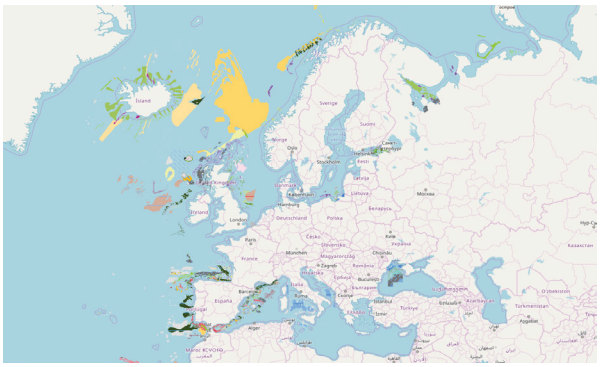
L6

Upper seafloor stratigraphy, lithology, and genesis maps representing the youngest marine Quaternary geological units, their age, genesis and physical characteristics.

- Multiresolution scale: 1/20.000 – 1/3.000.000
- Available to download as: ESRI file geodatabase
- Web services: WMS, WFS

Product in progress

Geomorphology



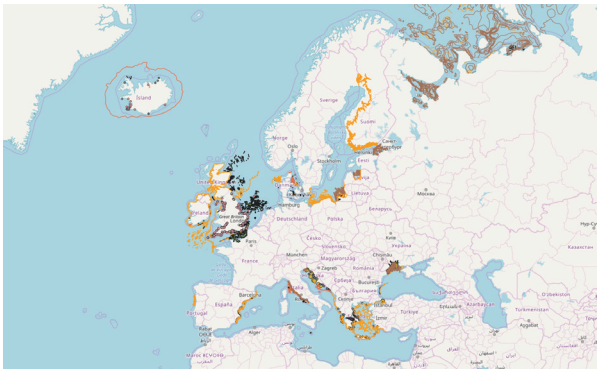
L6

Maps showing the geomorphology of the seafloor representing the "marine landscape" *i.e.* physiographic features (e.g. ridges, troughs, sea mounts, marine landforms) and their genesis.

- Multiresolution scale: 1/10.000 – 1/16.000.000
- Available to download as: ESRI file geodatabase
- Web services: WMS, WFS

Product in progress

Submerged landscapes

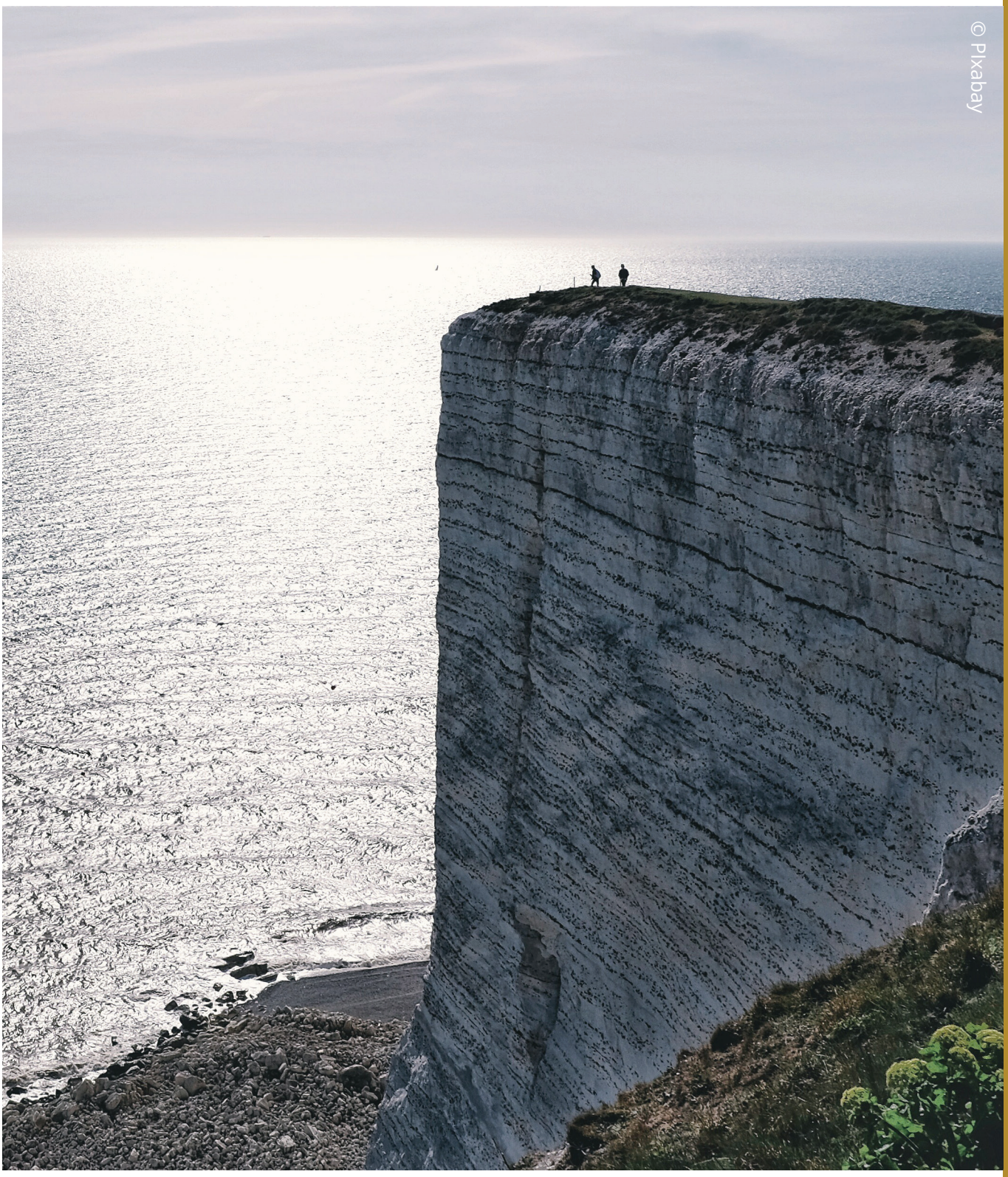


L6

This new data product released in April 2019, represents the geological known hidden landscapes in Europe. It includes more than 10.000 features representing 26 classes of submerged landscape and palaeoenvironmental indicators ranging from mapped and modelled palaeocoastlines, evidence for submerged forests and peats, thickness of post-Last Glacial Maximum sediments and submerged freshwater springs.

- Available to download as: ESRI file geodatabase
- Web services: WMS, WFS

Product in progress



More information on the data and data products of EMODnet Geology can be found scanning this QR code, or at www.emodnet-geology.eu.

EMODnet

SEABED HABITATS

Unlocking seabed habitat data in Europe

Parameters and data formats

L3

Habitat sample point data from surveys across Europe: this is a new dataset with further work being implemented to expand its spatial coverage as additional data is submitted.

Parameter category

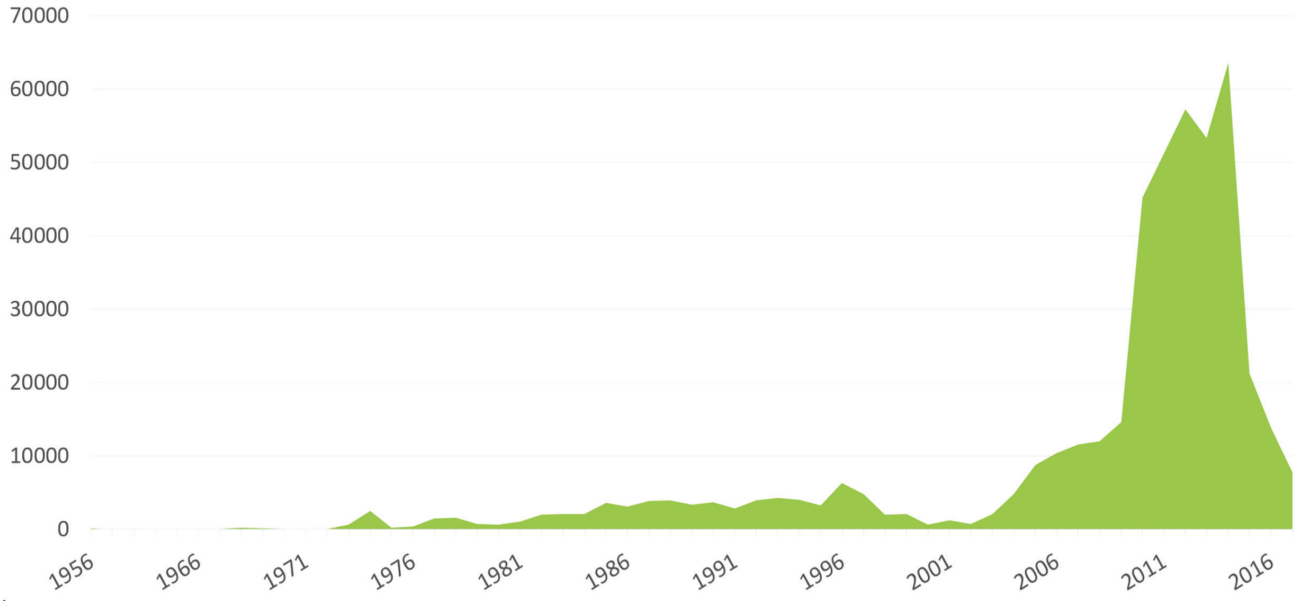
Benthic Habitat type given by EUNIS classification and alternative standardised habitat classification systems, both local and pan-European.

Data formats

WMS and WFS web services

Coverage and resolution

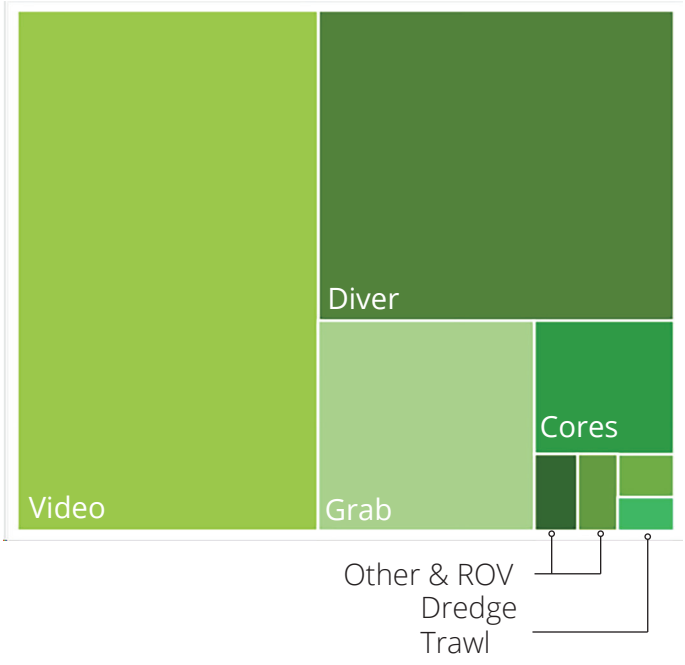
Temporal coverage: number of records per year.



Spatial coverage

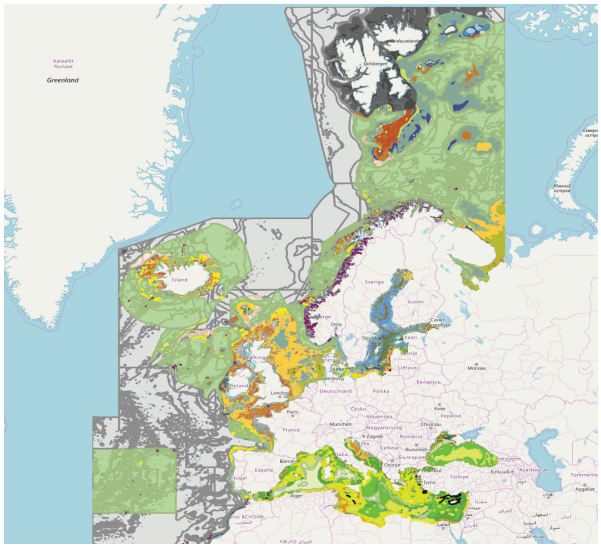
Note: spatial coverage is currently expanding to a pan-European scale.

Proportional availability of data per survey type



Broad-Scale Predictive Habitat Map EUNIS / full-detail habitat classification

L6

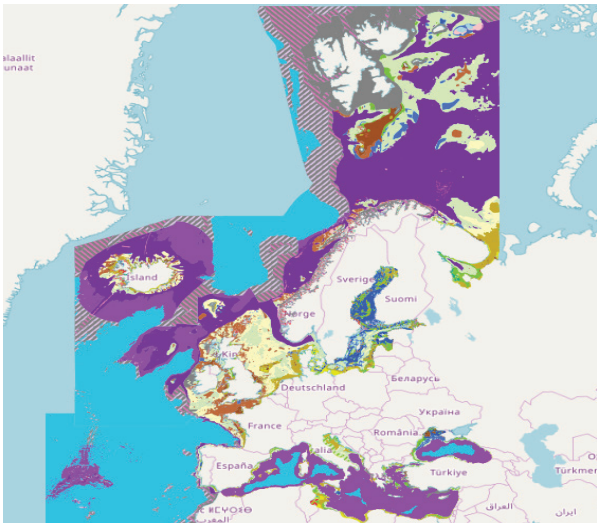


EUSeaMap 2019 Broad-Scale Predictive Habitat Map - EUNIS classification.

- With associated confidence layer
- Spatial resolution: ~100 m, 1/16 * 1/16 arc minute
- Available to download as: ESRI shapefile
- Web services: WMS

Broad-Scale Predictive Habitat Map MSFD Benthic Broad Habitats Map

L6

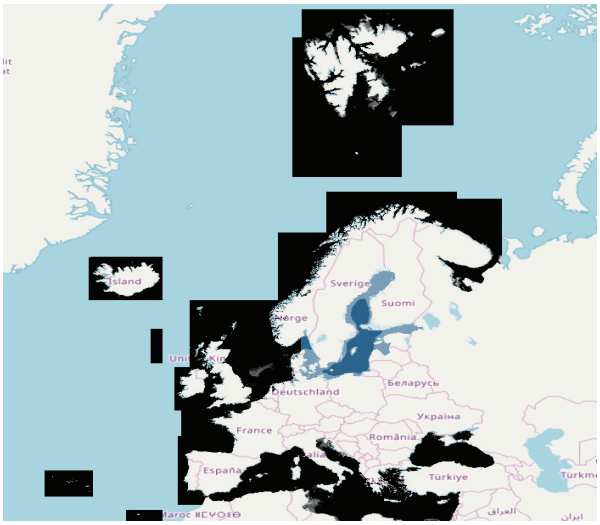


EUSeaMap 2019 Broad-Scale Predictive Habitat Map - MSFD Predominant Habitats.

- With associated confidence layer
- Spatial resolution: ~100 m, /16 * 1/16 arc minute
- Available to download as: ESRI shapefile
- Web services: WMS

Environmental variables that influence habitat type

L6



Maps and models of environmental variables that have been used to create the EUSeaMap 2019 data product.

- With associated confidence layer
- Spatial resolution: variable
- Available to download as: GeoTiff
- Web services: WMS, WCS

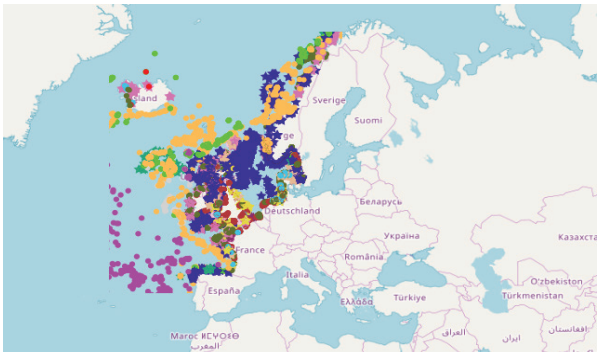
Example map: PAR (Photosynthetically Active Radiation) and Wave exposure index at surface (Baltic Sea).

SEABED HABITATS

Unlocking seabed habitat data in Europe

Composite data products

L6



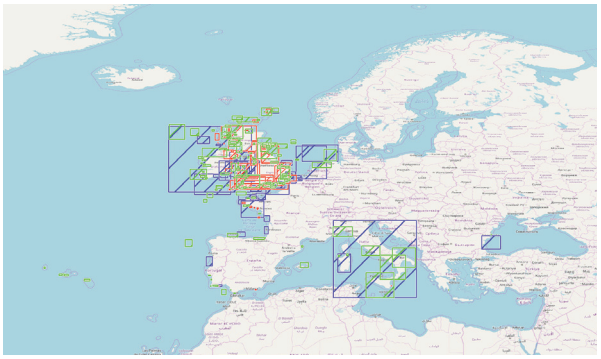
Compilations of data from multiple sources into new products that show the presence and extent of priority habitats, including OSPAR threatened and/or declining habitats and Essential Ocean Variables (live coral, seagrass and macroalgae). The official reported gridded distribution of habitat types listed in the Habitats Directive Annex 1 from the European Environment Agency are also available.

- Available to download as: ESRI shapefile
- Web services: WMS, WFS

Example map: OSPAR threatened and/or declining habitats in the NE Atlantic.

Collection of individual habitat maps from surveys

L6



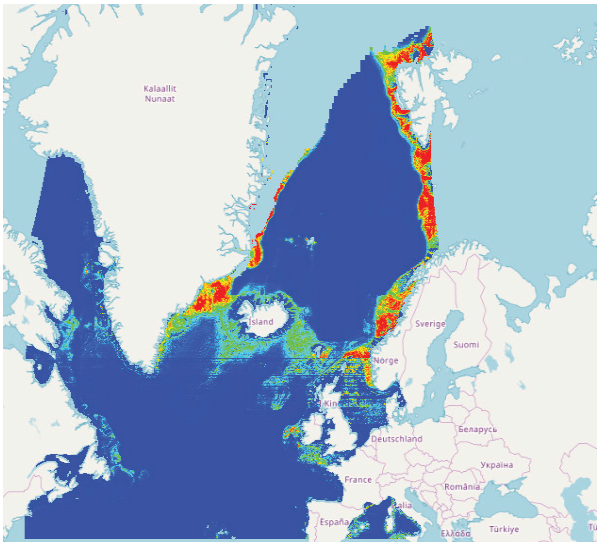
Collection of maps on broad-, medium- and fine-scale habitats with EUNIS classification, habitats of Directive Annex 1, and habitats classified according to other classification systems.

- Web services: WMS, WFS

Example map: broad-scale, medium-scale and fine-scale maps with EUNIS classification.

Collection of modelled maps of specific habitats

L6



Collection of maps illustrating the modelled spatial distributions (probabilities) of specific habitats (product built from external maps).

- Web services: WMS, WCS

Example map: Predictive habitat model of ostur distribution in the North Atlantic.

More information on the data and data products of EMODnet Seabed Habitats can be found scanning this QR code, or at www.emodnet-seabedhabitats.eu.

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Oceans physics at your fingertips

Parameters and data formats

L2 L3

Parameter groups and variables

- Water temperature (°C)
- Water salinity (psu)
- Water conductivity (biogeochemical): dissolved oxygen (kg/m³), fluorescence (S/m), turbidity (ml/l), total chlorophyll-a (mg/m³), etc.
- Currents and winds (m/s): direction
- River flow (m³/s)
- Optical properties: light irradiance surface PAR (micromole photon/m².s), turbidity (milliF.T.U Formza Turb Unit)
- Sea level (m)
- Atmospheric: air temperature (°C), relative humidity (%), atmospheric pressure (decibar, pascal)
- Underwater noise (dB)

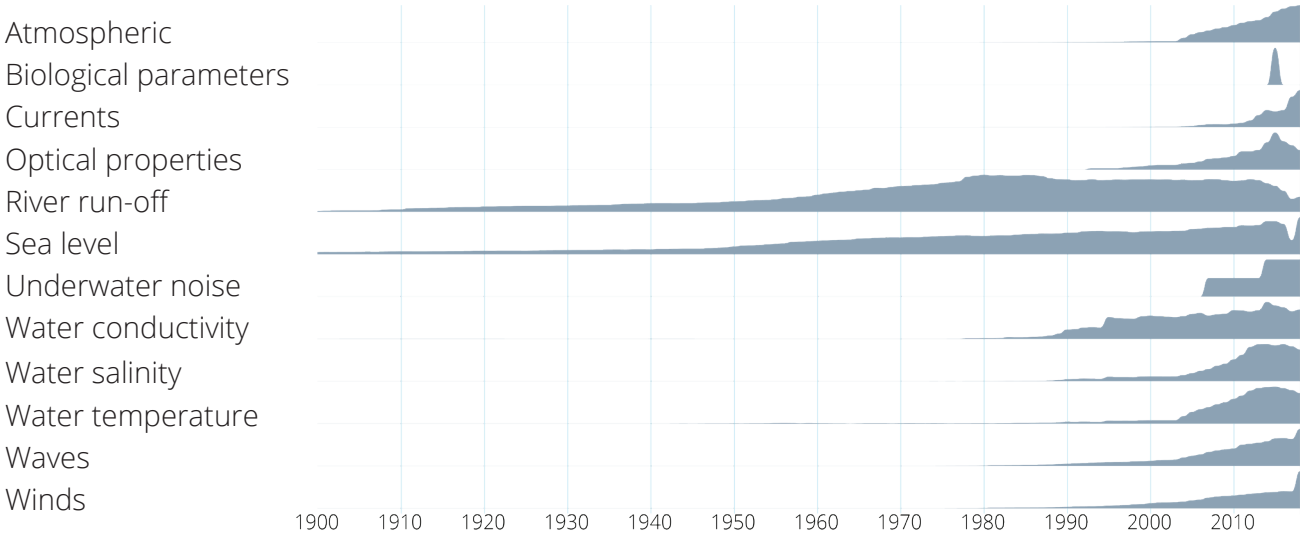
Platform types: argo/profiler, Bathy messages on GTS, drifting buoys, ferrybox/ship, gliders, marine mammal, mini logger, mooring time series, profiling mooring, radar, river station, TESAC messages on GTS, tide gauge, XBT or XCTD profiles.

Data formats
csv, NetCDF

Coverage and resolution

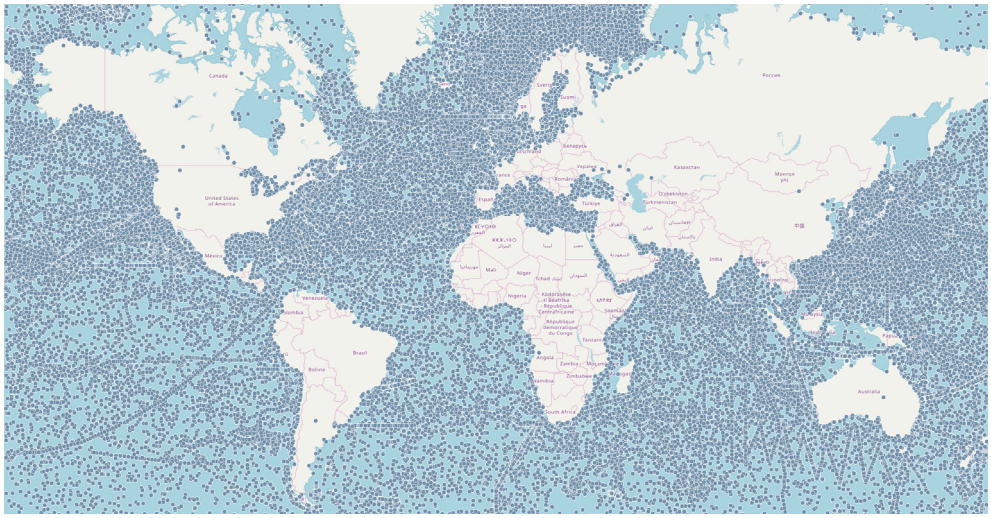
Temporal resolution: minutes to seasons

Temporal coverage: time series of the relative number of datasets per year from 1900 to present. EMODnet Physics also offers historical datasets that date back to 1807.

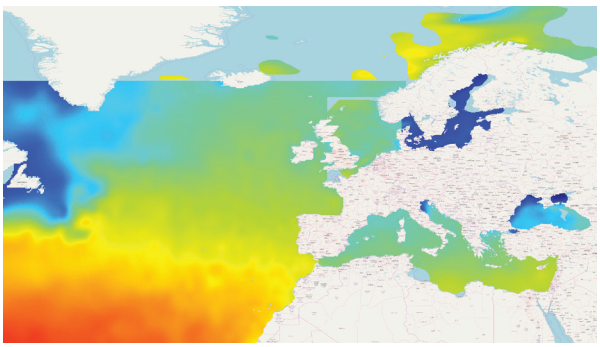


Spatial coverage

Overview of all the platforms that measure or have measured one or more physical variables.



Temperature

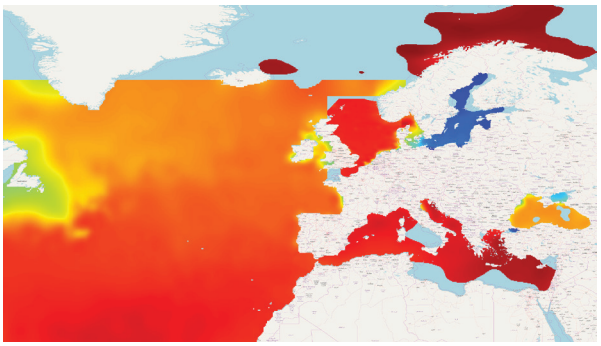


Aggregated SeaDataNet temperature, DIVA 4.6.10 interpolation.

- Mask: relative error threshold 0.5
- Temporal coverage: 1900 – 2013
- Temporal resolution*: 1 month
- Spatial resolution*: 8 – 22 km
- Depth coverage = -3000 – 0 m
- Web services: WMS

SeaDataNet

Salinity

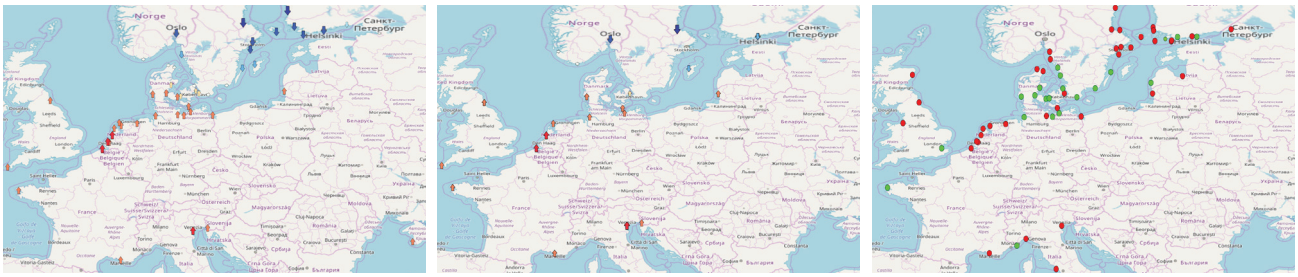


Aggregated SeaDataNet salinity, DIVA 4.6.10 interpolation.

- Mask: relative error threshold 0.5
- Temporal coverage: 1900 – 2013
- Temporal resolution*: 1 month
- Spatial resolution*: 8 – 22 km
- Depth coverage = -3000 – 0 m
- Web services: WMS

SeaDataNet

Sea Level Trends

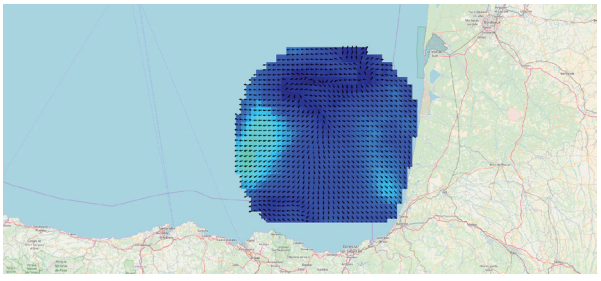


Relative (left) and absolute (middle) sea level trends, plus anomalies (right), by the Permanent Service for Mean Sea Level (PSMSL) and Système d'Observation du Niveau des Eaux Littorales (SONEL), expressed in mm/year. The trend is available for stations with at least 30 years of measurements.

- Temporal coverage: 1900 – 2016
- Spatial coverage: global with focus on Europe and North Atlantic
- Temporal resolution*: 1 year
- Web services: WMS, WFS

SONEL PSMSL Permanent Service for Mean Sea Level

Sea Surface Currents



In situ gridded sea surface currents as monitored by High Frequency Radars.

- Temporal coverage: near real time Sliding window of 60 days
- Temporal resolution: 1 hour
- Spatial resolution*: 5 – 150 km
- Available to download as: NetCDF
- Web services: WMS

*Note that resolutions are sea-basin dependent.

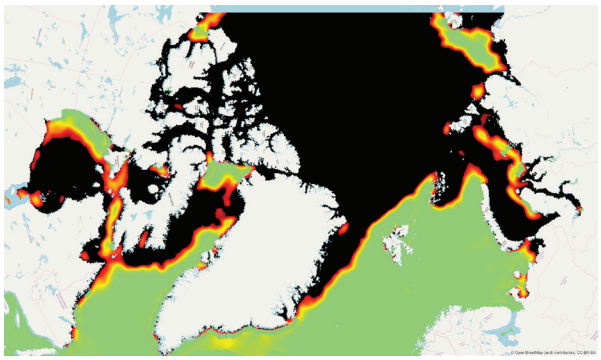
EMODnet

PHYSICS

Oceans physics at your fingertips

Sea Ice Coverage (Arctic and Antarctic Oceans)

L5



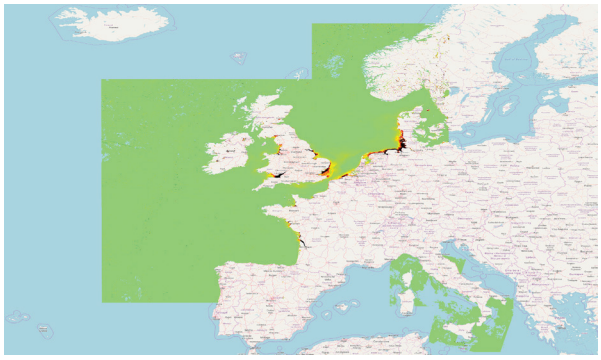
Sea ice coverage for the Arctic and Antarctic Oceans.

- Temporal coverage: 2005 – ongoing
- Spatial resolution: 10 km
- Web services: WMS

Copernicus

Total Suspended Matter

L5

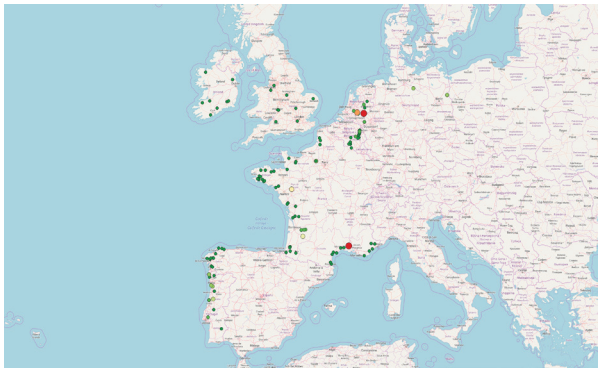


Monthly time series of total suspended matter.

- Temporal coverage: 2012 – 2013
- Temporal resolution*: 1 month
- Unit: % (suspended particles, that are not dissolved)
- Available to download as: NetCDF
- Web services: WMS, WFS

River run-off

L5

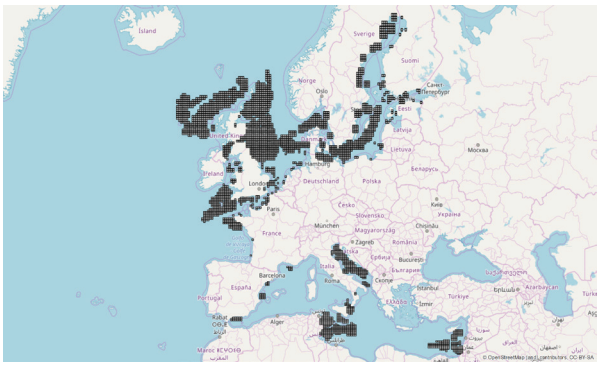


Database of the river gauging stations. A river gauging station is a location used by hydrologists or environmental scientists to monitor and test terrestrial bodies of water. EMODnet Physics is providing measurements of volumetric discharge (direct measurement or extracted by a model from the water level).

- Available to download as: NetCDF
- Web services: WMS, WFS

European Impulsive Noise Registry

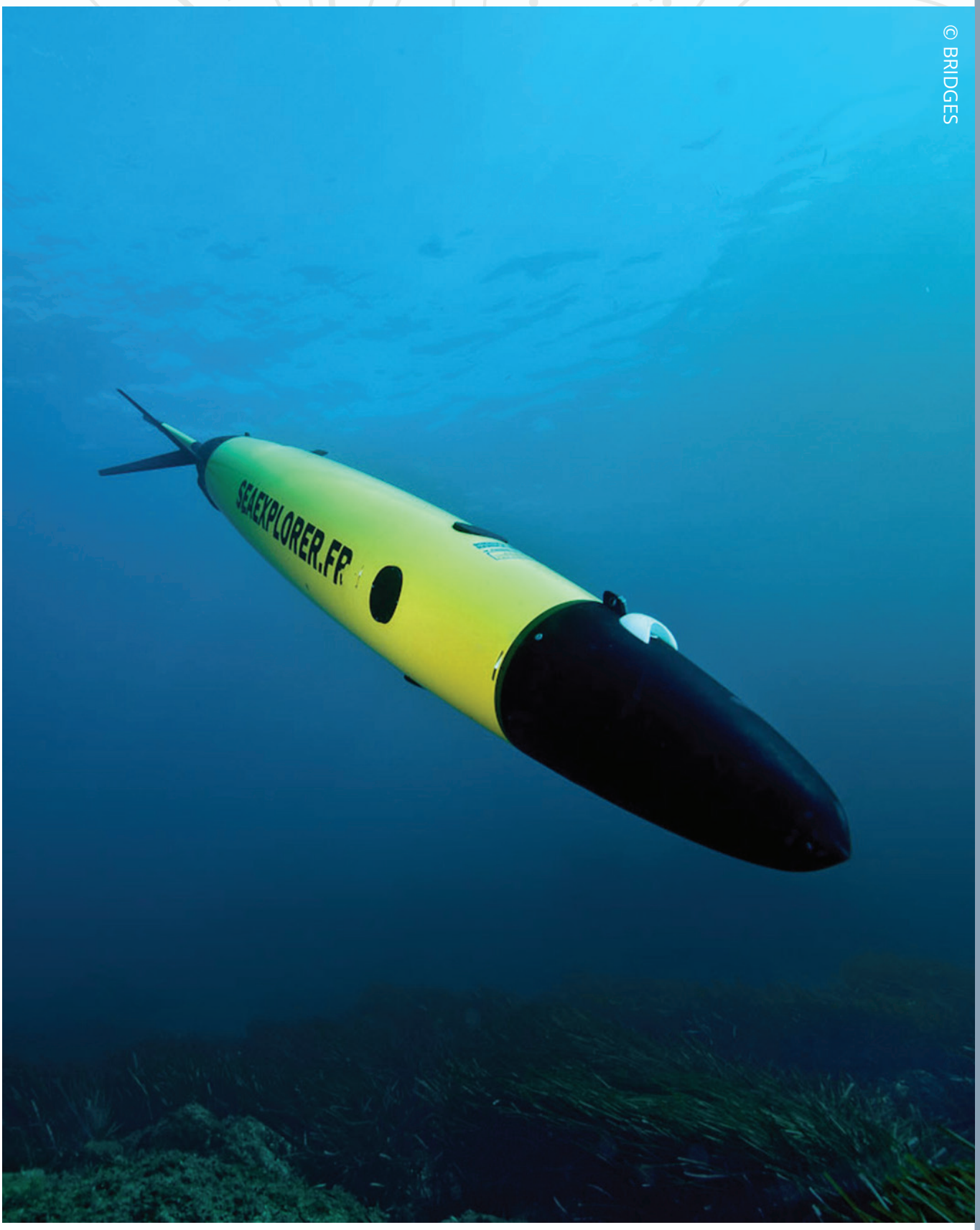
L5



This registry shows licenced events such as pile driving, controlled explosions from naval operations, and other activities that release energy (MSFD descriptor 11.1.1).

- Temporal coverage: 2014 – 2016
- Spatial resolution: grid 10 x 20 arc minute
- Unit: pulse block days
- Web services: WMS, WFS

HELCOM OSPAR COMMISSION ICES CIEM ACCOBAMS



© BRIDGES

More information on the data and data products of EMODnet Physics can be found scanning this QR code, or at www.emodnet-physics.eu.

CHEMISTRY

Data and products on marine water quality

Parameters and data formats

L3

Parameter groups

- Acidity
- Antifoulants
- Chlorophyll
- Dissolved gasses
- Fertilisers
- Heavy metals
- Hydrocarbons
- Marine litter
- Organic matter
- Pesticides and biocides
- Polychlorinated biphenyls
- Radionuclides
- Silicates

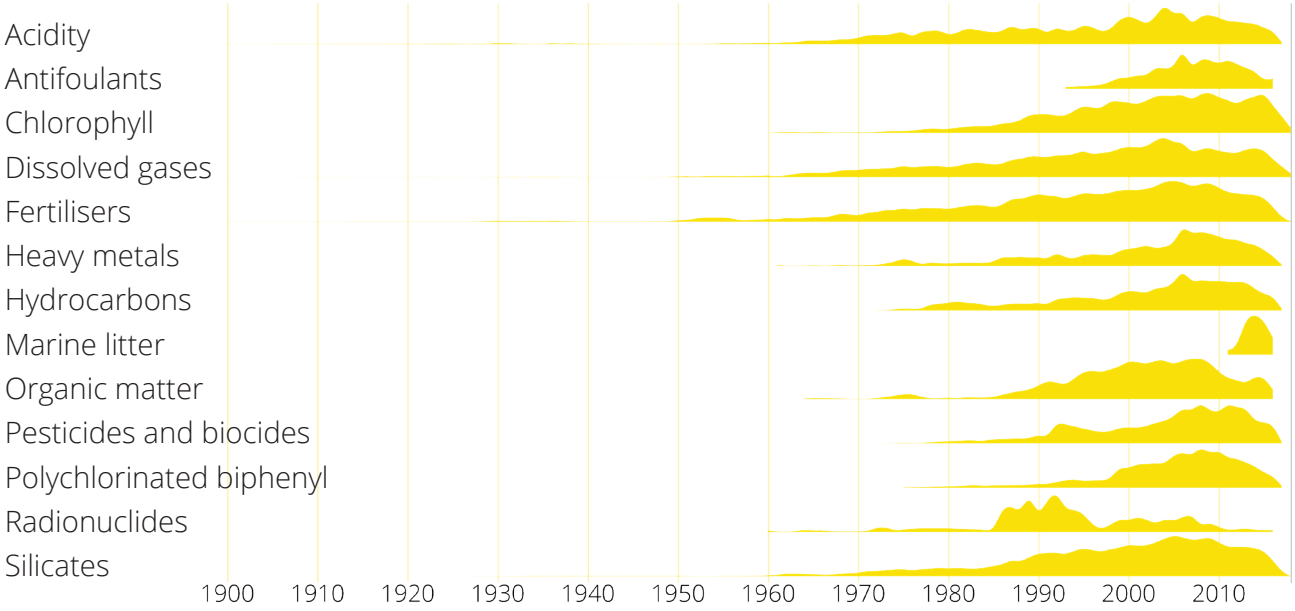
The parameters might have a depth and time component.

Data formats

ODV4 ASCII, MedAtlas ASCII, NetCDF (CF)

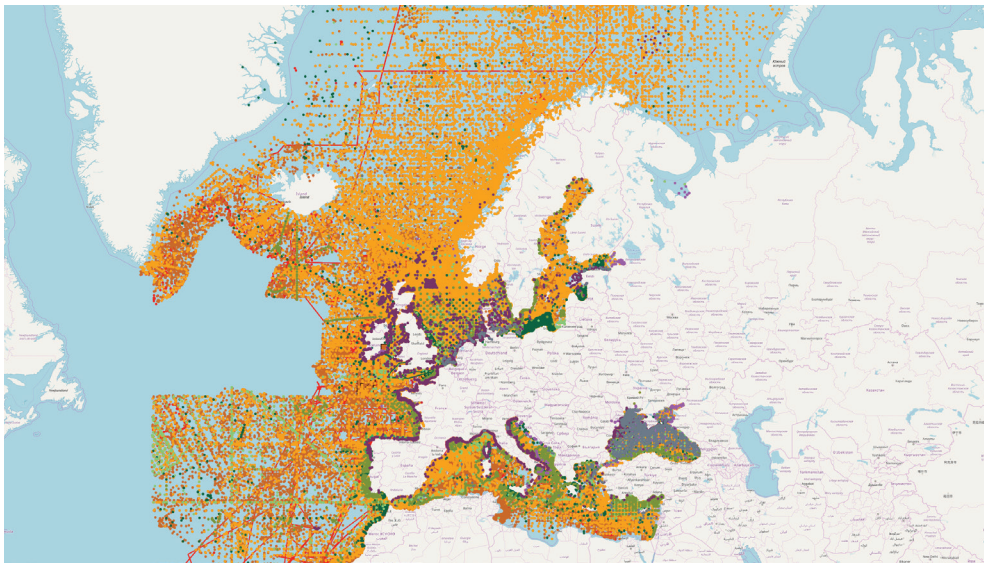
Coverage and resolution

Temporal coverage: time series of the relative number of datasets per parameter group.



Spatial coverage

Distribution of the available datasets (CDIs) in EMODnet Chemistry per parameter group.



Eutrophication, Ocean acidification aggregated datasets v2018

L4

Standardised, harmonised and validated data collections concerning eutrophication (nutrients, chlorophyll and oxygen) and ocean acidification (Alkalinity and pH) available per sea region (Mediterranean Sea, Black Sea, Arctic Region, Baltic Sea, North Sea and North East Atlantic Ocean). Available to download as ODV spreadsheet format that can be easily visualised with ODV Software (more information can be found at: http://www.seadatanet.org/Standards-Software/Software/ODV).

Contaminants aggregated datasets v2018

L4

Standardised, harmonised and validated data collections concerning contaminants (in seawater, biota and sediment) available per sea region (Mediterranean Sea, Black Sea, Arctic Region, Baltic Sea, North Sea and North East Atlantic Ocean). Available to download as ODV spreadsheet format that can be easily visualised with ODV Software (more information can be found at: http://www.seadatanet.org/Standards-Software/Software/ODV).

Marine litter aggregated datasets v2019

L4

Standardised and harmonised data collections concerning beach and seafloor litter. The harmonised datasets for beach litter can be downloaded as EMODnet Beach litter data format Version 1.0, which is a spreadsheet file composed of 4 sheets: beach metadata, survey metadata, animals and litter. Regarding seafloor litter, the collection can be downloaded as EMODnet Sea-floor litter data format Version 1.0, which is a csv file (tab separated values).

CHEMISTRY

Data and products on marine water quality

Chlorophyll-a

Regional gridded maps of water body chlorophyll-a available as 6-year analysis and combined for all EU basins.

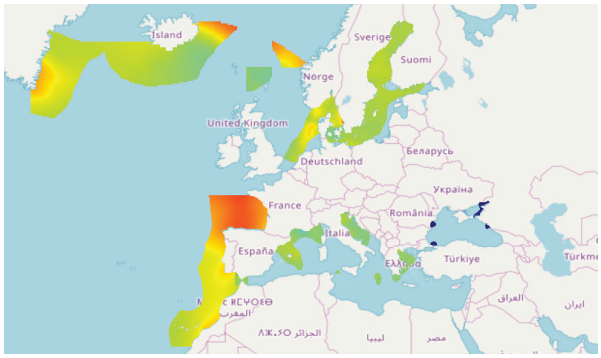
- Temporal coverage: 1960 – 2017*
- Temporal resolution: seasonal
- Spatial resolution: 0.1 degree
- Depth coverage: -1000 – 0 m
- Unit: mg/m³
- Available to download as: NetCDF
- Web services: WMS, OPenDAP

Dissolved inorganic nitrogen (DIN)

Regional gridded maps of water body dissolved inorganic nitrogen (DIN) available as 6-year analysis and combined for all EU basins.

- Temporal coverage: 1960 – 2017*
- Temporal resolution: seasonal
- Spatial resolution: 0.1 degree
- Depth coverage: -1000 – 0 m
- Unit: µmol/l
- Available to download as: NetCDF
- Web services: WMS, OPenDAP

Dissolved oxygen



Regional gridded maps of water body dissolved oxygen available as 6-year anaysis and combined for all EU basins.

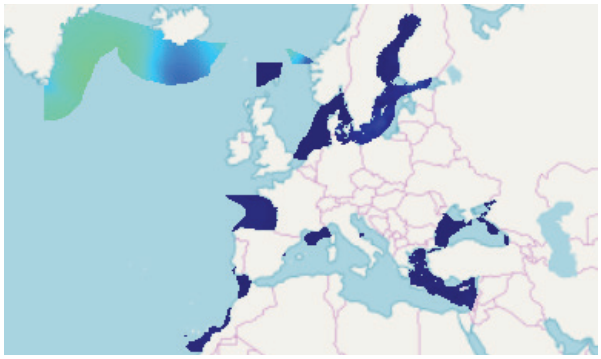
- Temporal coverage: 1960 – 2017*
- Temporal resolution: seasonal
- Spatial resolution: 0.1 degree
- Depth coverage: -1000 – 0 m
- Unit: µmol/l
- Available to download as: NetCDF
- Web services: WMS, OPenDAP

Silicate

Regional gridded maps of water body silicate available as 6-year analysis and combined for all EU basins.

- Temporal coverage: 1960 – 2017*
- Temporal resolution: seasonal
- Spatial resolution: 0.1 degree
- Depth coverage: -1000 – 0 m
- Unit: µmol/l
- Available to download as: NetCDF
- Web services: WMS, OPenDAP

Phosphate



Regional gridded maps of water body phosphate available as 6-year analysis and combined for all EU basins.

- Temporal coverage: 1960 – 2017*
- Temporal resolution: seasonal
- Spatial resolution: 0.1 degree
- Depth coverage: -1000 – 0 m
- Unit: µmol/l
- Available to download as: NetCDF
- Web services: WMS, OPenDAP

Regional gridded maps of 6-year analysis of nutrients, dissolved oxygen and chlorophyll concentration

Moving 6-year analysis, at seasonal scale, of water body chlorophyll-a, dissolved oxygen, dissolved inorganic nitrogen (DIN), phosphate and silicate concentration, available at distinct depth layers, for the Arctic Region, North East Atlantic Ocean, Baltic Sea, North Sea, Mediterranean Sea and Black Sea, implemented following MSFD board guidelines.

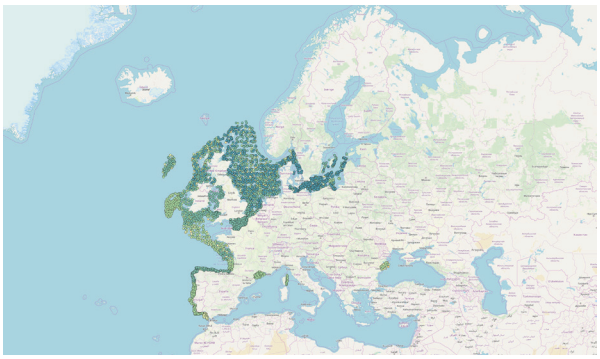
*Note that actual values are are sea-basin and parameter dependent.

Marine litter maps for beach and seafloor litter

L5

Beach litter
Qualitative and quantitative analysis of beach litter data. Products related to metadata (sampling locations, temporal coverage and survey quantification) and data (abundance and composition) are available for monitoring and other sources (research and cleaning). Abundance of specific types of litter items are accessible (cigarette-related items, fishing-related items and plastic bags).

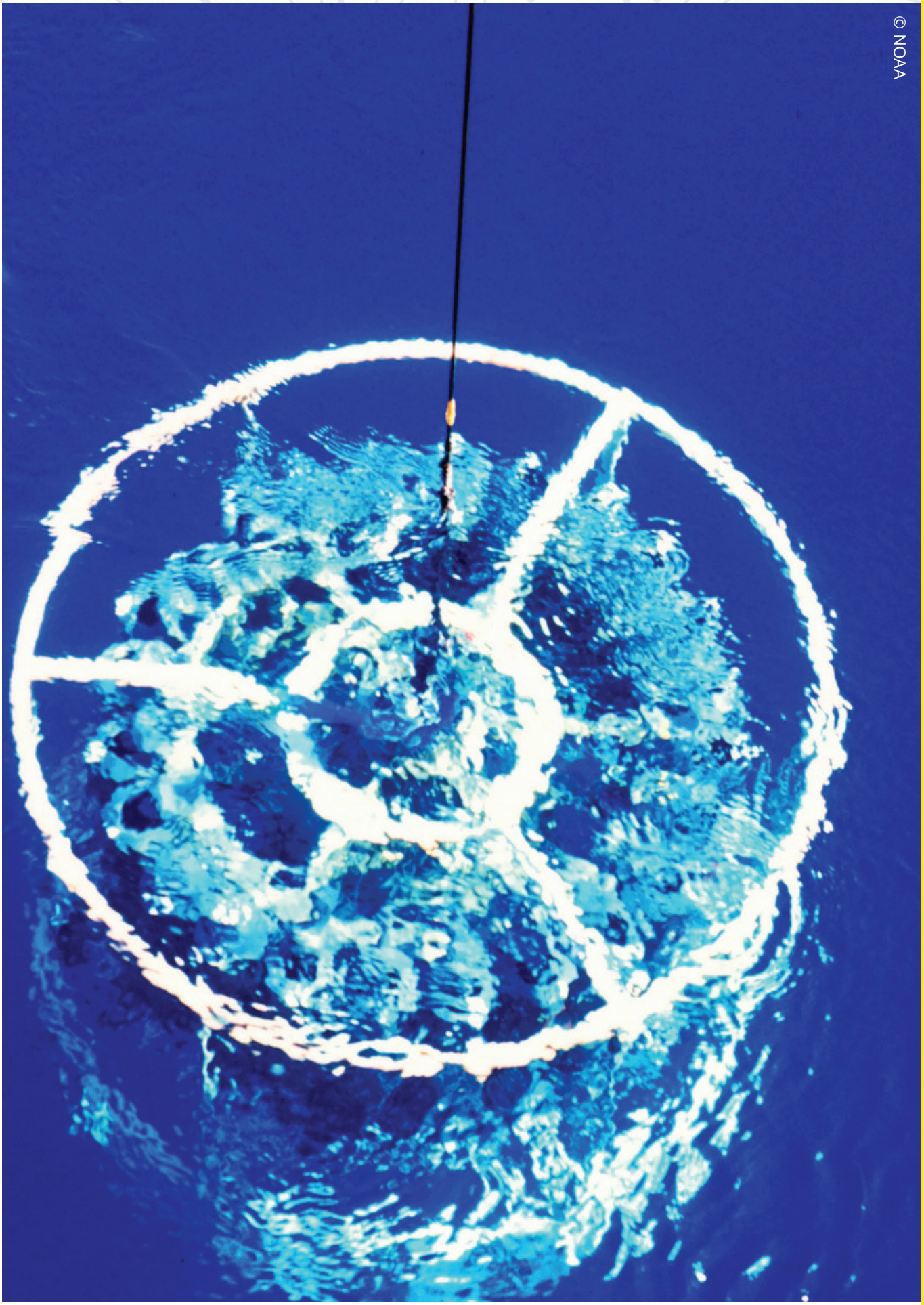
- Temporal coverage: 2001 – 2018
- Temporal resolution: annual
- Spatial coverage: all EU marine regions
- Available to download as: Shapefile, MapInfo, GML, KML, GeoJSON
- Web services: WMS, WFS



Seafloor litter
Qualitative and quantitative analysis of seafloor litter data. Products related to metadata (sampling locations, temporal coverage and survey quantification) and data (density and composition) are available. Density of specific types of litter items are accessible (fishing-related items and plastic bags).

- Temporal coverage: 2006 – 2018
- Temporal resolution: annual
- Spatial coverage: Baltic, North, Atlantic, Mediterranean and Black Seas
- Available to download as: Shapefile, MapInfo, GML, KML, GeoJSON
- Web services: WMS, WFS

More information on the data and data products of EMODnet Chemistry can be found scanning this QR code, or at www.emodnet-chemistry.eu.


© NOAA

EMODnet

BIOLOGY

Dive into data on Europe's marine life

Parameters and data formats

L3

Parameter groups

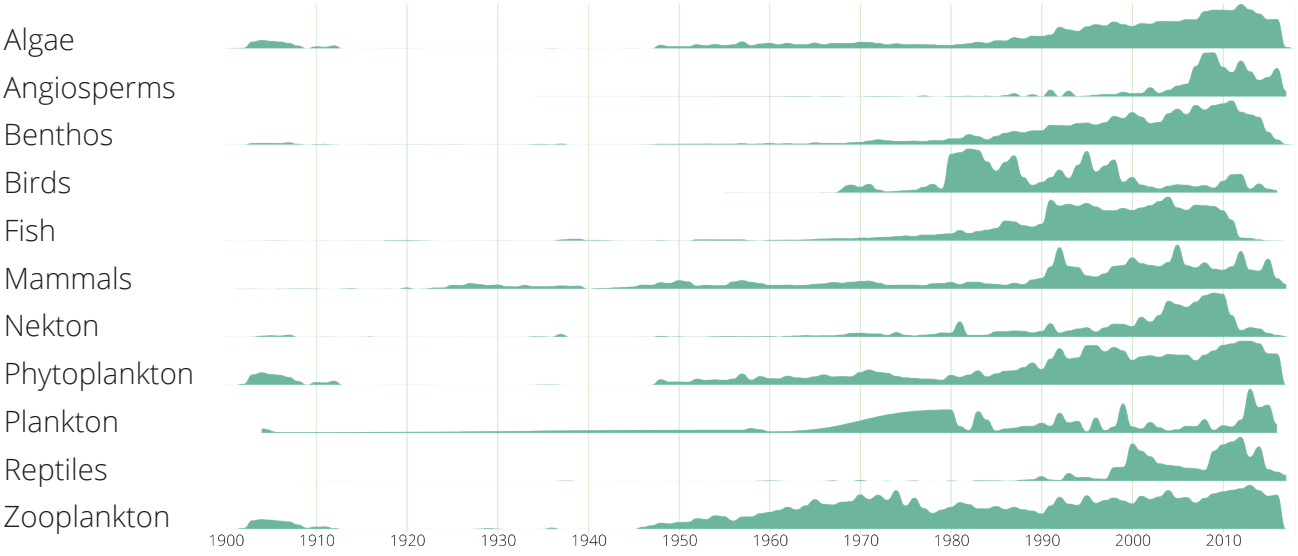
- Species occurrences: location, date, depth
- Biological measurements: e.g. abundance, biomass
- Sampling information and methodology
- Specimen characteristics: e.g. length, lifestage, sex
- Abiotic parameters: e.g. sediment type, temperature, salinity

Data formats

Darwin Core Archive (DwC): occurrence data and measurements can be downloaded as csv, and accessed via WFS web services.

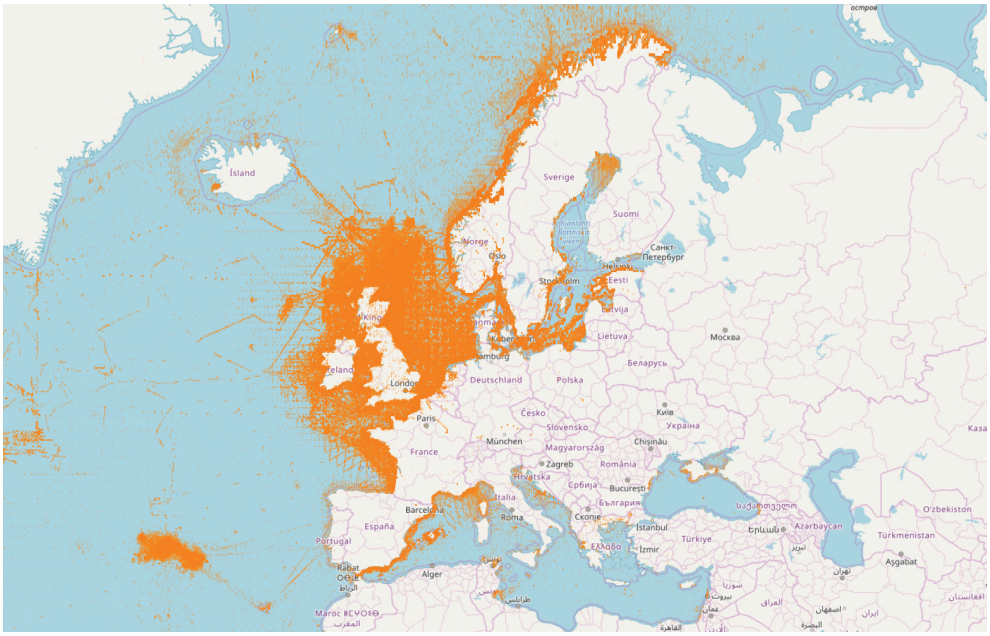
Coverage and resolution

Temporal coverage per functional group: time series of the relative number of records per functional group from 1900 to present. EMODnet Biology/OBIS offers species occurrence data that date back to 1526.



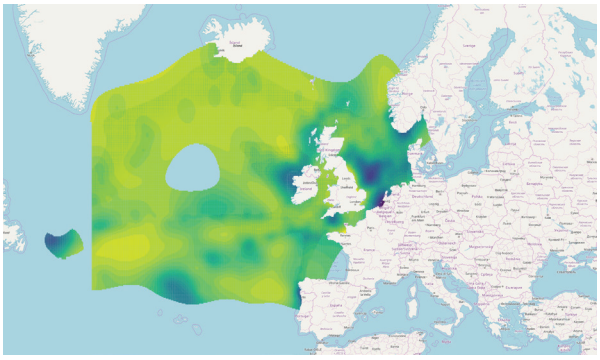
Spatial coverage

Map showing the location of the distribution records available in EMODnet Biology/EurOBIS to date (25/07/2019): currently 874 datasets representing 25.279.688 occurrence records, from 80,556 species names.



Phytoplankton biomass and diversity

L5



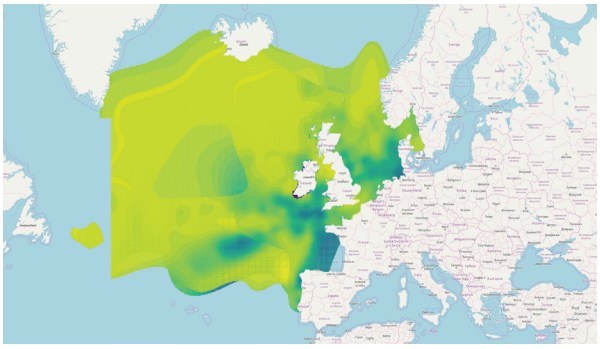
Gridded maps of average abundance of different species or species groups.

- Temporal coverage: 1958 – 2016
- Temporal resolution: seasonal, annual or multi-annual
- Spatial resolution: 0.1 degree
- Taxonomic coverage: phytoplankton species and functional groups
- Web services: WMS, WFS

Example map: diatoms abundance.

Zooplankton biomass and diversity

L5



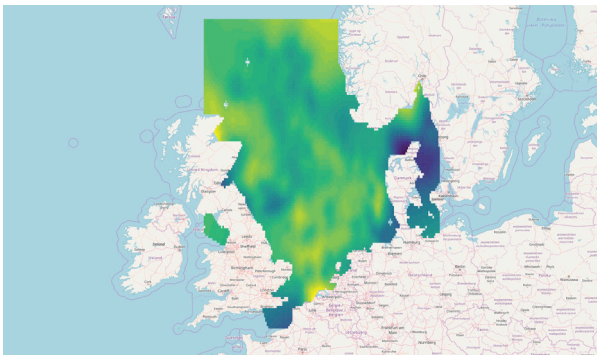
Gridded abundance maps of the six most abundant copepod species collected with the Continuous Plankton Recorder (CPR).

- Temporal coverage: 1958 – 2016
- Temporal resolution: 10-year and 1-year averages
- Taxonomic coverage: *Calanus h.*, *Calanus f.*, *Acartia* spp., *Oithona s.*, *Temora l.* , *Metridia l.*
- Temporal resolution: seasonal
- Spatial resolution: 0.1 degree
- Web services: WMS, WFS

Example map: *Calanus helgolandicus.*

Fish abundance and distribution

L5



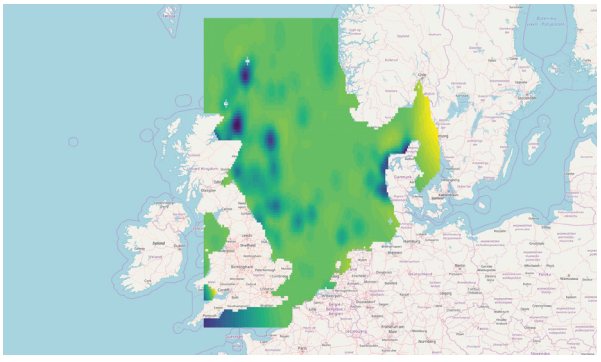
Gridded maps of average abundance of different species or species groups.

- Temporal coverage: 1980 – 2013
- Temporal resolution: annual or multi-annual
- Spatial resolution: 0.1 degree
- Taxonomic coverage: *Gadus morhua, Clupea harengus, Engraulis encrasicolus, Scomber scombrus, Sprattus sprattus*
- Web services: WMS, WFS

Example map: *Gadus morhua.*

Marine turtles, birds, mammals abundance and distribution

L5



Gridded maps of average abundance of different species or species groups.

- Temporal coverage: 1998 – 1999, 1995 – 1997, and 1980 – 1989
- Temporal resolution: annual or multi-annual
- Spatial resolution: 0.1 degree
- Taxonomic coverage: seabirds, reptiles, marine mammals
- Web services: WMS, WFS

Example map: *Phocoena phocoena.*

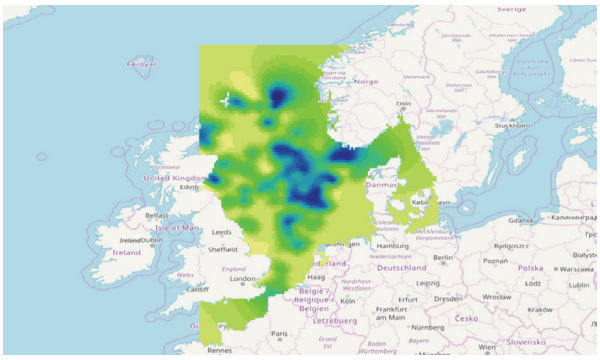
EMODnet

BIOLOGY

Dive into data on Europe's marine life

Benthic invertebrate abundance and distribution

L5



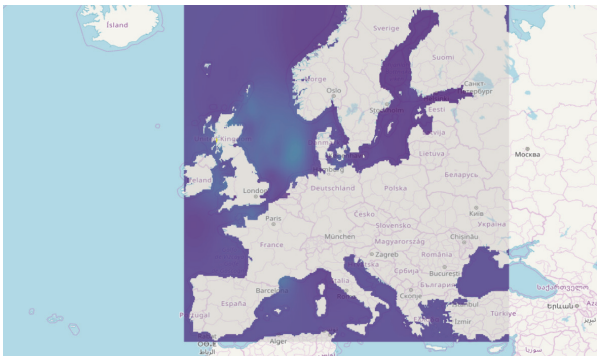
Gridded maps of average abundance of different species or species groups.

- Temporal coverage: 1986 – 2013
- Temporal resolution: annual or multi-annual
- Spatial resolution: 0.1 degree
- Taxonomic coverage: *Abra prismatica, Amphiura filiformis, Bathyporeia elegans, Chaetozo ne setosa*, etc.
- Web services: WMS, WFS

Example: map *Abra prismatica.*

Macrobenthos functional trait based analysis

L6

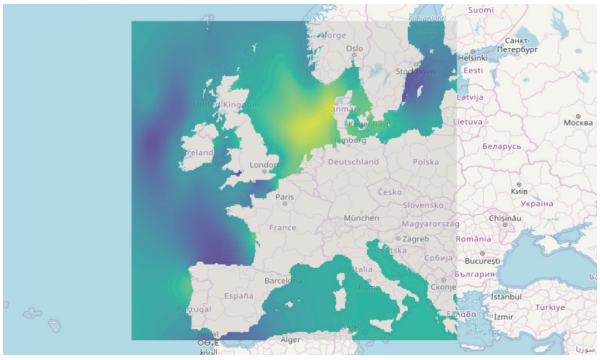


This series of products displays the main functional types of seafloor macroinvertebrates derived from a multivariate analysis of 13 life history traits defined on 617 taxa (illustrative map: vulnerability to physical damage). Other maps display scores for each of the 60 trait modalities aggregated over absolute and relative organism densities averaged per spatial location.

- Temporal resolution: 1 year – several decades
- Spatial resolution: 0.1 degree
- Taxonomic coverage: macrozoobenthos

Fish functional trait based analysis

L6



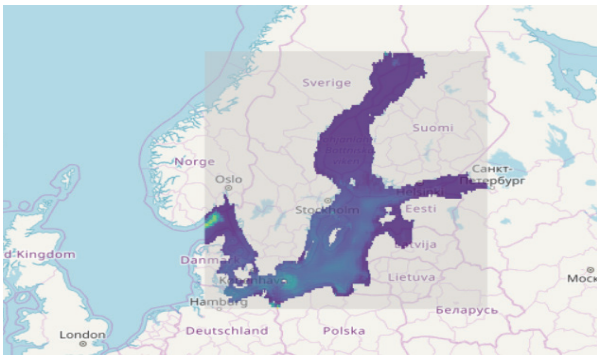
This series of products displays the main functional types and four main living modes of benthic and bentho-pelagic fish species derived from a multivariate analysis of eight life history traits defined on 161 taxa (illustrative map: relative abundance of small pelagic fish). Other maps display scores for each of the trait modalities aggregated over absolute and relative densities averaged per spatial location.

- Temporal resolution: decadal (2000 -)
- Spatial resolution: 0.1 degree
- Taxonomic coverage: benthic and bentho-pelagic fish

More information on the data and data products of EMODnet Biology can be found scanning this QR code, or at www.emodnet-biology.eu.

Neural network modelling of Baltic zooplankton abundances

L6



These Baltic Sea products are gridded data products for 40 zooplankton species using a neural network modelling approach. The neural network uses dissolved oxygen, salinity, temperature, chlorophyll concentration, bathymetry and the distance from coast as input. (illustrative map: *Acartia longiremis* in 2007).

- Temporal resolution: 2007, 2008, 2010, 2011, 2012 and 2013
- Spatial resolution: 0.1 degree
- Taxonomic coverage: zooplankton

Other products

- Thermal niche maps: Summaries of the environmental temperatures at which European marine species have been observed to occur, aggregated and gridded to give average thermal affinities of assemblages of major functional groups (benthos, zooplankton, macroalgae, etc.) at a 0.5 degree resolution. These are compared against current and future temperature projections under different 'IPCC scenarios'.
- Time series analysis: Workflows using phyto- and zooplankton timeseries data to show the evolution over time of depth-averaged abundance of major groups of species, as well as the most frequent species. An interactive dynamic multivariate representation of the communities shows the long-term trend as a shift in yearly and seasonal fluctuation.
- Invasive marine species: Maps showing the occurrences of marine invasive species in European marine harbours based on EurOBIS data, in order to identify *same risk areas*.

© Jeremy Bishop

Parameters and data formats

L4

Parameter groups and subcategories

- Aggregate extraction
- Algae production: macroalgae, microalgae
- Aquaculture: finfish, shellfish and freshwater production
- Cables: telecommunication, landing stations, BSH CONTIS cables, SIGCables Submarine Cables Routes
- Cultural heritage: ship wrecks, lighthouses (removed/not removed), submerged prehistoric archaeology and landscape
- Dredging sites
- Environment: Natura 2000, nationally designated areas, state of bathing water
- Fisheries: ICES statistical areas, FAO fishery statistical area, fish catches by FAO fishery statistical areas, fish sales
- Hydrocarbon extraction: active licences, boreholes, offshore installations
- Nuclear power plants
- Ocean energy facilities: project locations and test sites
- Other forms of area management / designation: advisory councils, international conventions, maritime boundaries, MSFD reporting units
- Pipelines (decommissioned, in service, out of use, planned, proposed, under construction)
- Traffic in main ports
- Waste disposal: dredge spoil dumping, dumped munitions
- Wind farms (authorised, operational, planned, under construction)

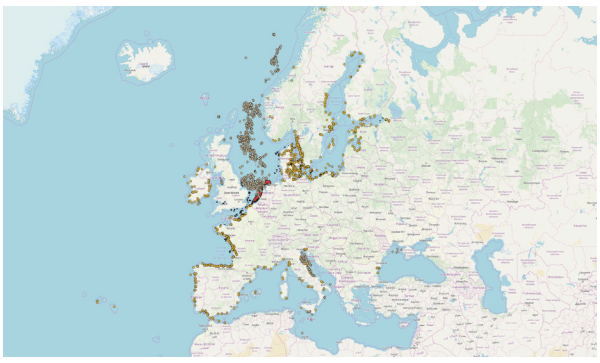
Data formats

ESRI shapefile, ESRI File Geodatabase, WMS and WFS web services

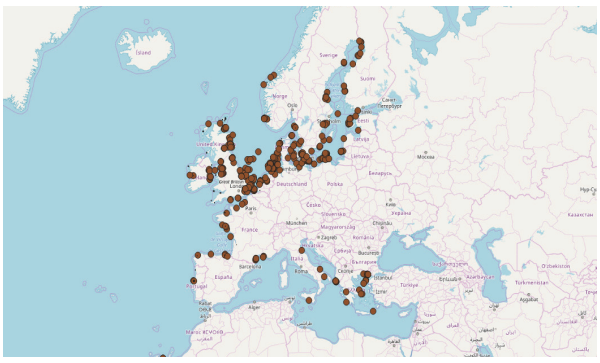
Coverage and resolution

Spatial coverage: the following example maps illustrate the distribution of the respective human activities.

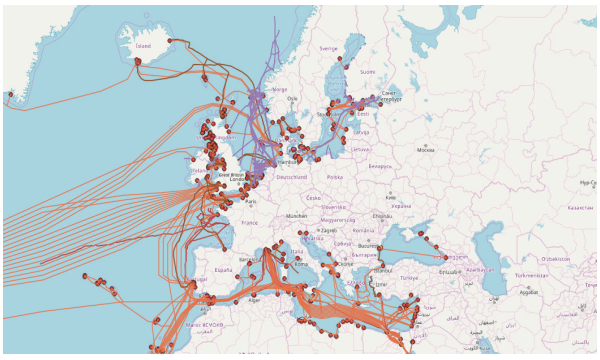
Dredging, aggregate extraction and offshore platform locations



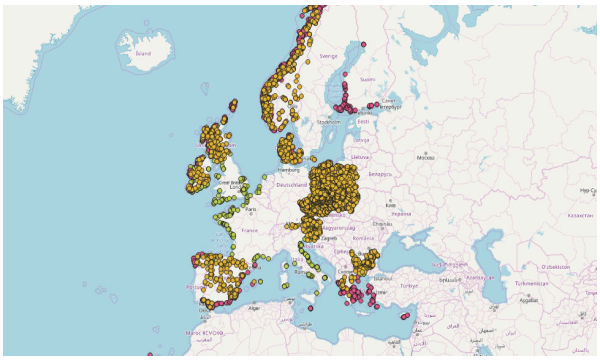
Energy facilities and wind farms



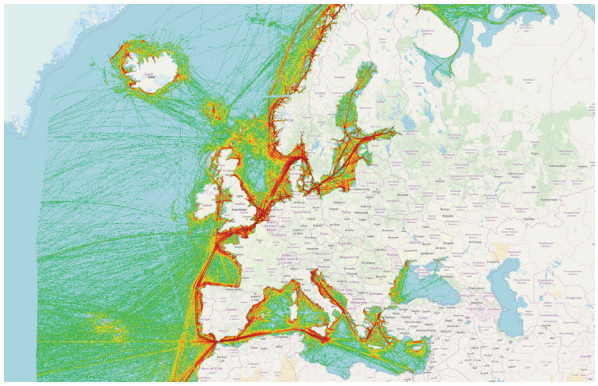
Submarine cables and pipelines



Finfish, freshwater and shellfish production sites



Vessel density maps



Vessel Density Maps showing vessel movement patterns over EU waters. .

- Temporal coverage: 2017 – 2018
- Temporal resolution: monthly and annual
- Spatial resolution: 1 km²
- Format: GeoTIFF
- Web services: WMS, WCS

More information on the data and data products of EMODnet Human Activities can be found scanning this QR code, or at www.emodnet-humanactivities.eu.

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Key | Data and data product processing levels

L0 Raw data. Unprocessed instrument data at full resolution, including synchronisation methods (e.g. elimination of CTD up-down duplicates) and excluding communication artifacts.

L1 Full resolution data reconstructed with calibration coefficients, geo- and time-referenced.

L2 Geo- and time-referenced processed (derived) data with a minimum QC. Near-real time (NRT) with full spatial and/or temporal resolution.

L3 Delayed mode data with further QC, usually with some completeness, consistency and space/time uniformity. Data QC checks may include comparison with historical data and/or Level 5 products such as climatologies or gridded data.

L4 Collated data from different measurements, samples and/or sources that have been integrated in a data system by means of standardisation and/or categorisation, and subset or otherwise selected or derived to fulfil a specific requirement. Data can represent numerical values and presence/absence of a category or entity. Integration of datasets at this level enables further QC based on parameter to parameter relationships (e.g. TS diagrams).

Data

L5 Model or analysis output that uses data of Level 2 and/or 3 as input. Data products of this level represent the spatial distribution of a single parameter derived from multiple measurements. Data are aggregated and undergo some level of geo-processing and spatial or temporal interpolation to cover data gaps and/or solve data discrepancies.

L5A. One-dimensional distribution of a specific parameter, without variations on the temporal or depth dimensions.

L5B. Two-dimensional distribution of a specific parameter, with variations on the temporal and/or depth dimensions.

L5C. Three-dimensional distribution of a specific parameter.

L6 Derived information from multi-variable model or analysis that has Level 5 data products and/or Level 2-3 data as input. These input data and data products might have been gathered or developed by the thematic lot itself, by other thematic lots or third parties.

Data products

EMODnet

European Marine Observation and Data Network

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.