



EMODnet



European Marine
Observation and
Data Network

Your gateway to marine data in Europe

EMODnet Central Portal data services

Simon Claus, Paula Oset, Francisco Hernandez, Bart Vanhoorne, Filip Waumans,
Jan-Bart Calewaert, Pascal Derycke, Alessandra Giorgetti, Helen Lillis, Antonio
Novellino, Alessandro Pititto, Dick Schaap, Henry Vallius, Thierry Schmitt

info@emodnet.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.

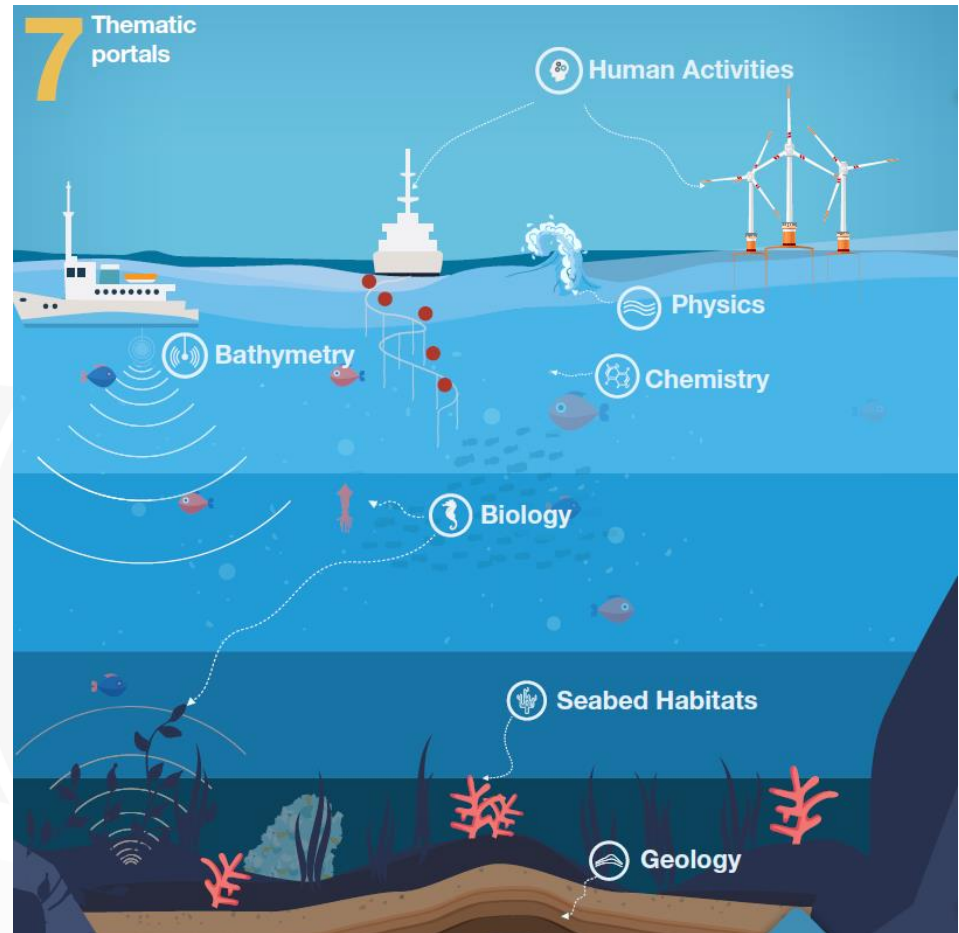


What is EMODnet?

EMODnet



- ① Long-term marine data initiative
- ① Multidisciplinary network of 150+ organisations amongst seven thematic portals
- ① Unlock marine data resources
- ① Facilitate sustainable marine investment through data harmonisation and sharing
- ① Discover gaps in data availability







EMODnet



Objectives EMODnet Central Portal

EMODnet Central portal and data services

 to visualize and provide access to the thematic data products, that are being build and managed in the individual thematic EMODnet projects

 organize user services to facilitate and increase access and usage of the EMODnet portal.







EMODnet



European Marine
Observation and
Data Network

EMODnet Central Portal & data services

Different services for different users

-  General 'professional' user: overview of the data products through a GIS interface and metadata catalogue
-  Marine spatial planner, practitioner: create a summary overview of the marine area under assessment, based on the data services of EMODnet
-  Data scientist: describe where to find the services, how to access them and provide examples in different environments (QGIS, R, python...)
-  General public, outreach, schools: *European Atlas of the Seas*

Basic idea:

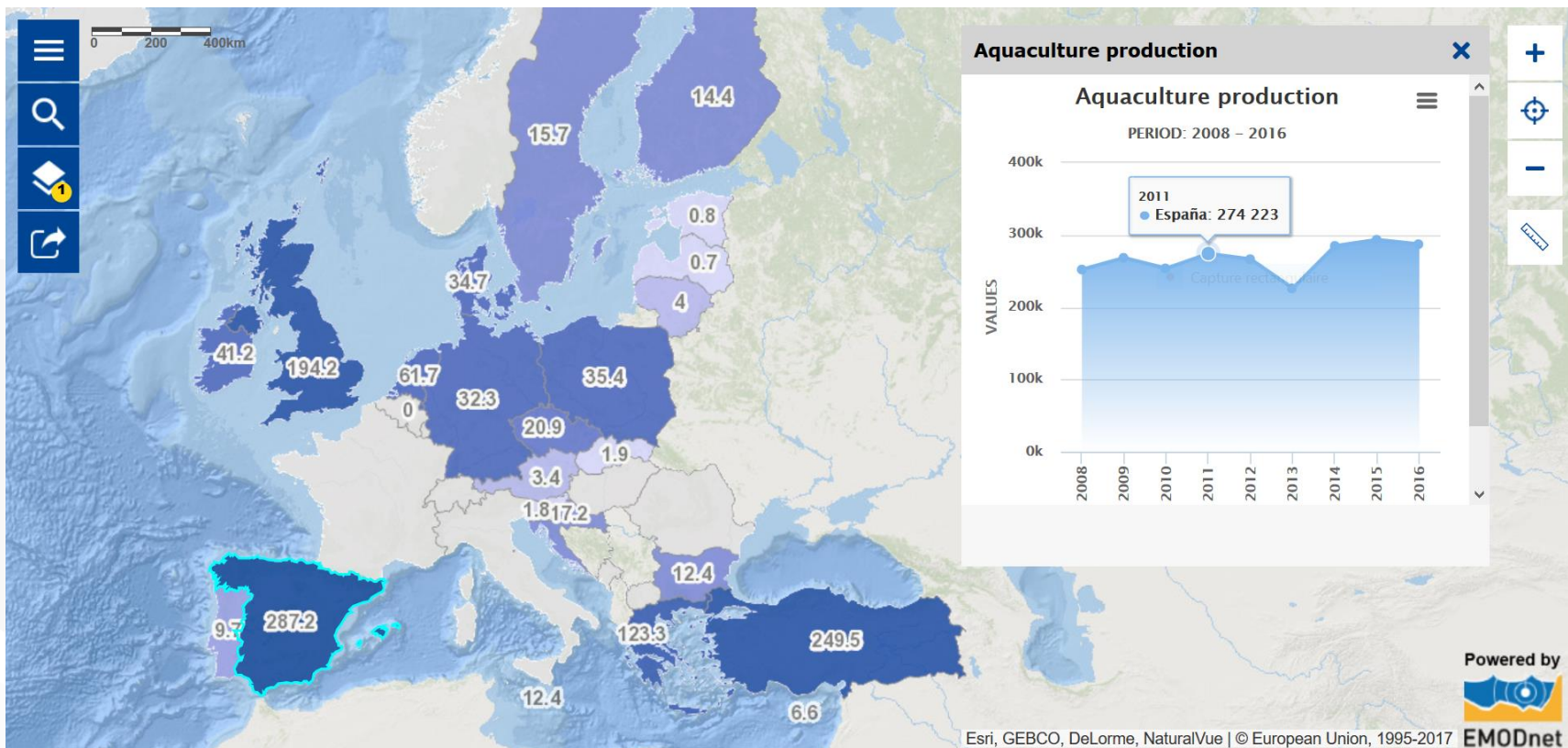
-  Retrieve and combine information from multiple thematic data products via one single interface
-  Using **(OGC)** web services



EMODnet



European Atlas of the Seas



Ex: Aquaculture production (2008 to 2016)

Informative, educational, simple and playful





EMODnet



European Marine
Observation and
Data Network

General 'professional' user

📡 Overview of the data products through a metadata catalogue

📡 196 data product descriptions, harvested (5 providers) in a *Geonetwork instance via CSW*

📡 *EMODnet Chemistry (52)*

📡 *EMODnet Biology (47)*

📡 *EMODnet Geology (35)*

📡 *EMODnet Human activities (33)*

📡 *EMODnet Physics (25)*

📡 *EMODnet Seabed habitats (3)*

📡 *EMODnet Bathymetry (1)*

📡 Metadata: abstract, download and links, about the resource, technical information, metadata information

📡 *INSPIRE-metadata* rules



EMODnet

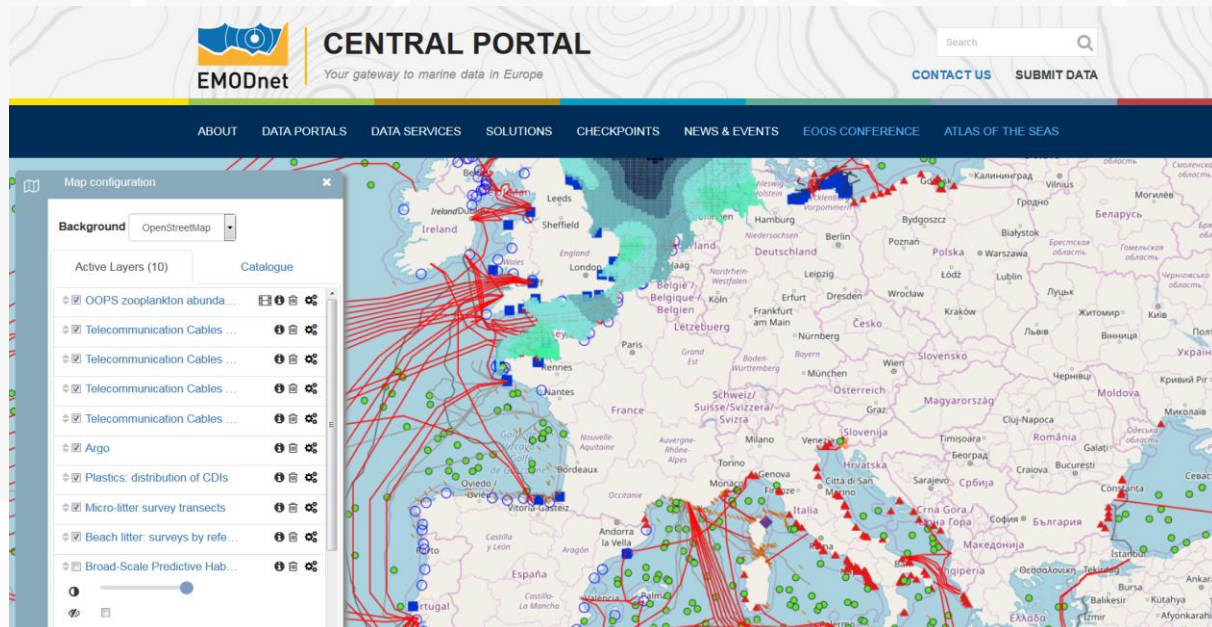


European Marine
Observation and
Data Network

General 'professional' user

Overview of the data products through a GIS interface

- Developed *in house* (Open layers, Javascript, AngularJS, PHP, Symfony, PostgreSQL)
- Displays, animates data products, links from product to metadata and download
- Uses **WMS** to display products (**getMap**, **getLegendGraphic**, **getFeatureInfo**)





EMODnet



Marine spatial planner, practitioner

Query tool - Concept

- (()) Tool for a preliminary assessment and early phase planning of a particular activity
- (()) Retrieve information from multiple thematic data products via one single interface
- (()) The tool needs to be easy to use, so comprehensive information can be easily be accessed by the 'marine spatial planner'
- (()) Using OGC services (**WFS, WCS**)

Basic functionalities

- (()) To select an area of interest (bounding box)
- (()) To retrieve summary statistics for the selected layer(s)
- (()) To get a pdf/html report with maps and summary statistics of selected layer(s)

Extended functionalities

- (()) Filtering options
- (()) Select by pre-defined polygons



EMODnet



European Marine
Observation and
Data Network

Query tool 1.0

- Retrieve data from data products for specific locations using OGC services (WFS)
 - Version 1.0: User input: list of coordinates
 - Drawbacks V.1.0: Does not work for areas, tool and output file too complex

	A	B
1	Latitude	Longitude
2	50.15	1.30
3	51.20	1.74
4	52.11	1.12
5	51.15	1.39
6	51.49	1.42
7	51.58	1.31
8	51.41	1.37
9	51.49	1.36
10	51.50	1.35
11	51.47	1.36



	A	B	C	D
1	Latitude	Longitude	Bathymetry_depth	SH_habitat_type
2	50.15	1.30	value	value
3	51.20	1.74	value	value
4	52.11	1.12	value	value
5	51.15	1.39	value	null
6	51.49	1.42	value	value
7	51.58	1.31	value	value
8	51.41	1.37	value	value
9	51.49	1.36	value	null
10	51.50	1.35	value	value
11	51.47	1.36	value	value

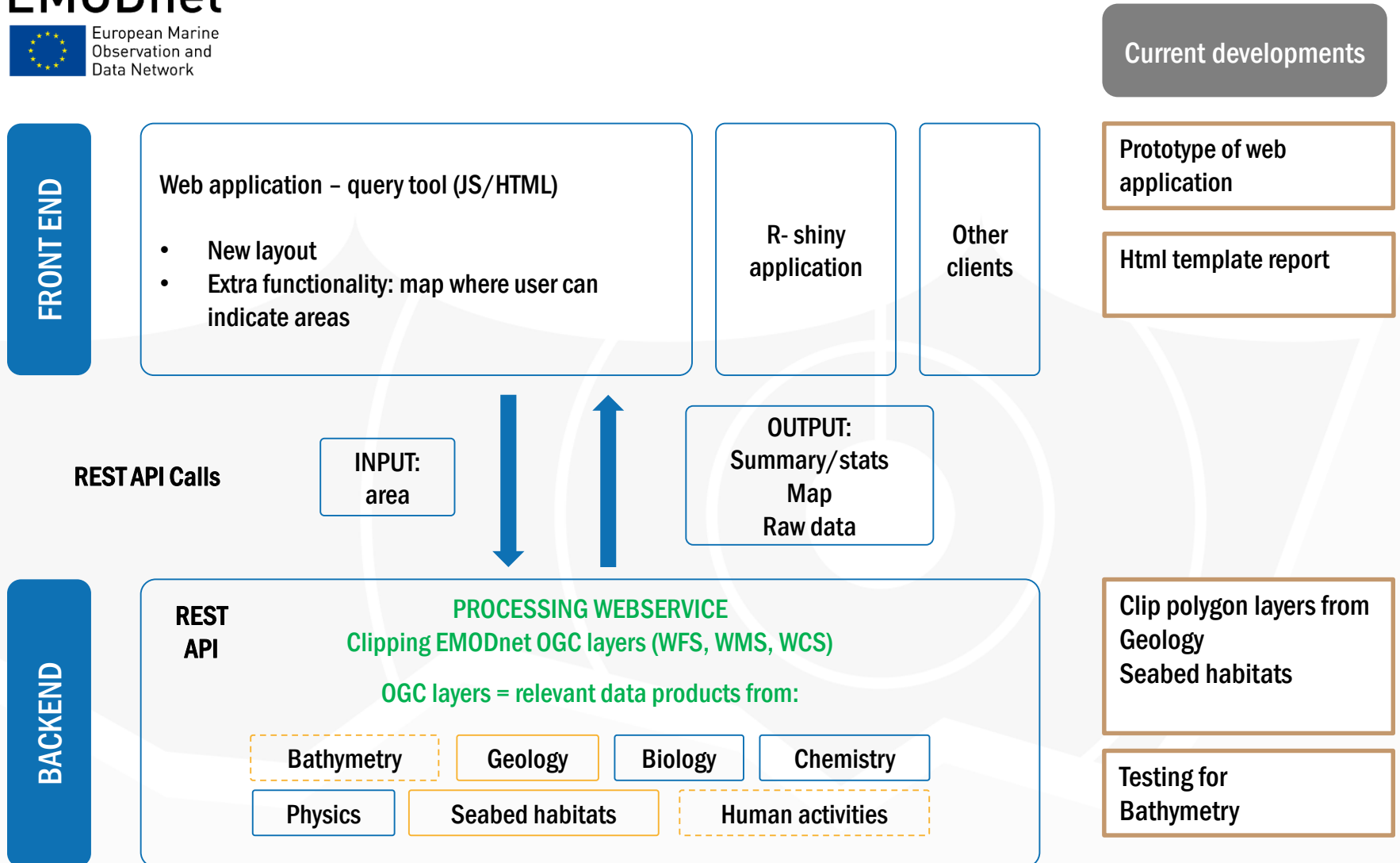


EMODnet



European Marine
Observation and
Data Network

Data services (II): Query tool 2.0

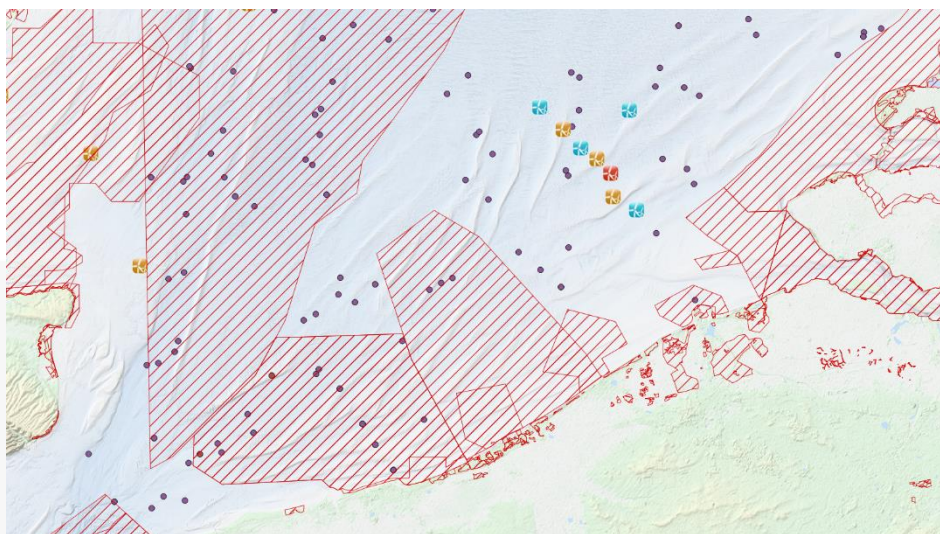




EMODnet



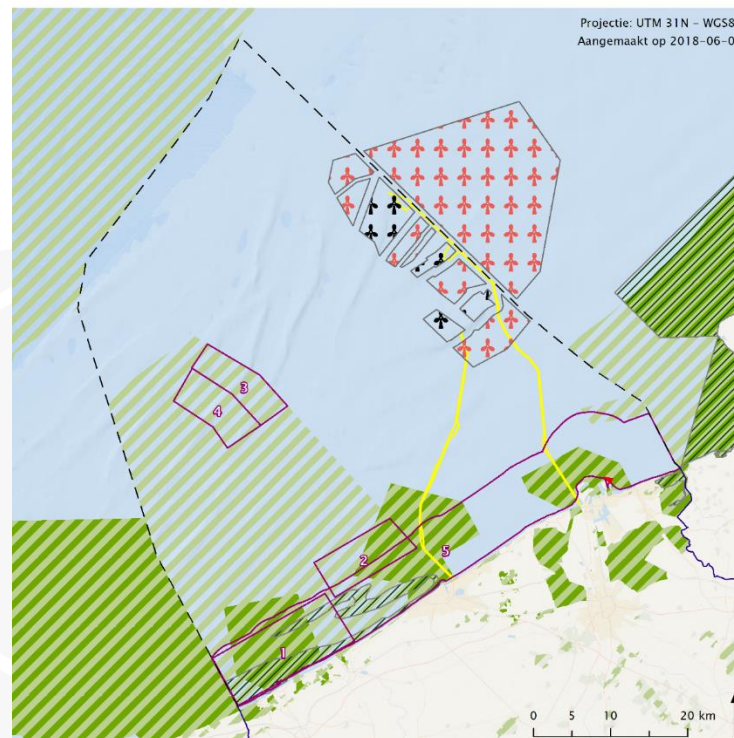
Query tool 2.0 prototype



Natuur Belgisch deel van de Noordzee



Projectie: UTM 31N - WGS84
Aangemaakt op 2018-06-08



Legende

- Belgisch deel van de Noordzee
- Exportkabel
- Windmolenpark
- Gepland
- Operationeel
- Visserijbeperkende maatregelen
- Habitatrichtlijngebied
- Vogelrichtlijngebied
- Ramsargebied
- Natuurreservaat 'Baai van Heist'

Bronnen

- Basiskaart: ESRI
- Belgie: NGI
- Belgisch deel Noordzee: Vlaamse Hydrografie
- Exportkabel: MUMM
- Windmolenparken: EMODnet
- Visserijbeperkende ...: FOD Financiën
- Habitatrichtlijngebied: Natura2000
- Vogelrichtlijngebied: Natura2000
- Ramsar: Geopunt, Nationaal Georegister, MUMM
- Natuurreservaat 'BvH': FOD Financiën



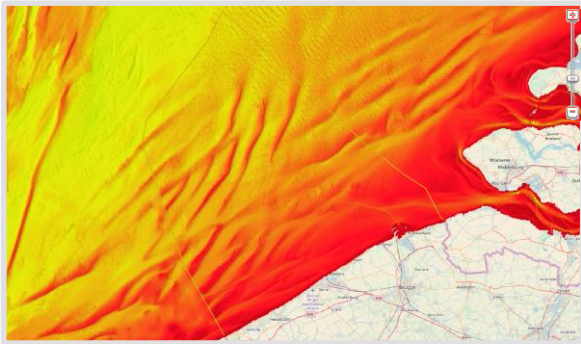
EMODnet



European Marine
Observation and
Data Network

Valuable information from data products

Bathymetry



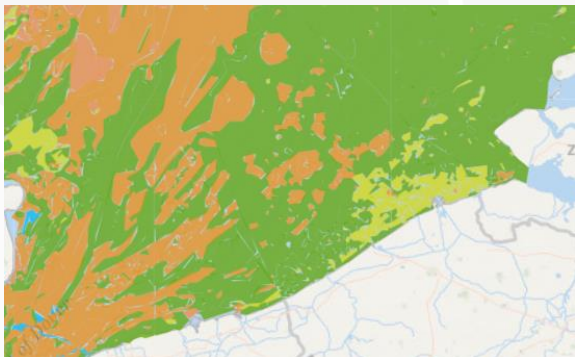
Mean depth

Average depth of selected area

Minimum depth of selected area

Maximum depth of selected area

Geology



Seabed substrate 250k

% of substrate type in
selected area

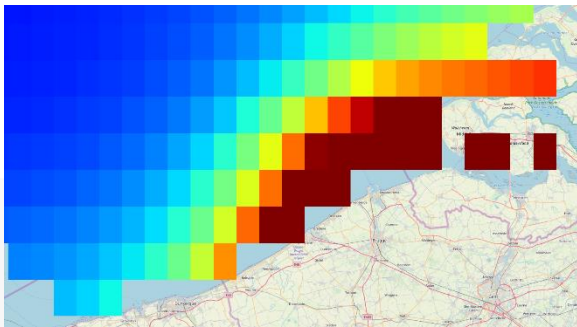


EMODnet



Valuable information from data products

Chemistry

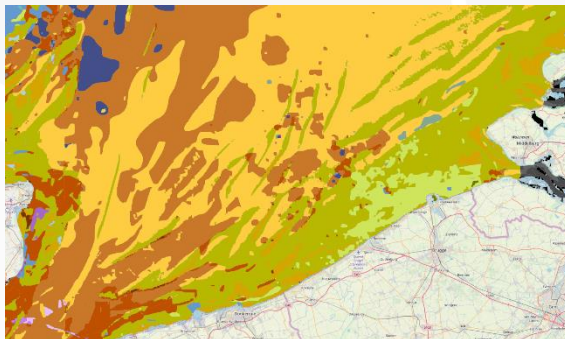


Concentrations of ammonium, Chla-a, dissolved oxygen, phosphate and silicate, averaged per season, at different depths

Min, max, average

	Winter	Spring	Summer	Autumn
2000	value	value	value	value
2001	value	value	value	value
2002	value	value	value	value
2003	value	value	value	value
2004	value	value	value	value

Seabed habitats



Broad-Scale Predictive habitat Map

- 36.1% " A5.27: Deep circalittoral sand
- 31.4% " A5.25 or A5.26: Circalittoral fine muddy sand
- 18.5% " A5.15: Deep circalittoral coarse
- 6.55% " A5.35 : Circalittoral sandy mud

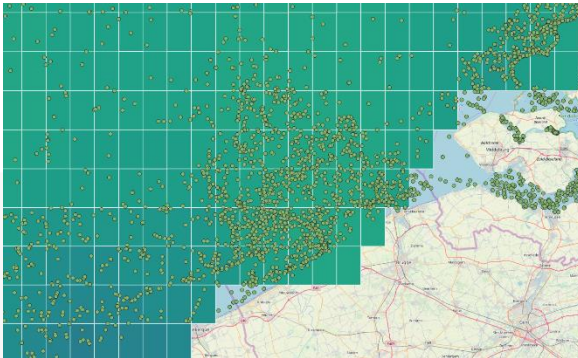


EMODnet



Valuable information from data products

Biology



Species list - number of observations (and possible gridded abundances) of species per

- EOV group
- Protection status
- Invasive status
- Indicator species

- Number (#) of species in selected area: xxx (download full list)
- # of records in selected area: xxx (download)
- # of Red list species in selected area: xxx (download)
- # of HAB species in selected area: xxx (download)
- # of Invasive species in selected area: xxx (download)
- # of MSFD indicator species: xxx (download)
- # of Habitat directive species: xxx (download)

Human activities



Location of human activities, installations, infrastructure (e.g. aquaculture, pipelines, wind farms, oil/gas platforms, shipping routes, etc.)

Presence/absence, count



EMODnet



European Marine
Observation and
Data Network

Query tool 2.0 prototype

CENTRAL PORTAL
Your gateway to marine data in Europe

Latitude: Min Max
Longitude: Min Max

Data sources

- Bathymetry
- Seabed Habitats**
- Combined
- Bio Zones
- Biology
- Chemistry
- Geology
- Human Activities
- Physics

Statistics

Seabed Habitats

Combined

- 46.15 % A5.27: Deep circalittoral sand
- 37.06 % A5.25 or A5.26: Circalittoral fine s muddy sand
- 9.1 % A5.35 : Circalittoral sandy mud
- 3.98 % A5.15: Deep circalittoral coarse sec
- 1.37 % A5.14: Circalittoral coarse sediment
- 1.12 % A5.37: Deep circalittoral mud
- 0.79 % A5.23 or A5.24: Infralittoral fine sand
- 0.24 % A5.45: Deep circalittoral mixed sed
- 0.13 % A5.44: Circalittoral mixed sediment
- 0.04 % A5.36: Circalittoral fine mud
- 0.02 % A5.33 : Infralittoral sandy mud

Area: 2220.35 km²

[Download](#)

Leaflet | Tiles © Esri — Sources: GEBCO, NOAA, CHS, OSU, UNH, CSUMB, National Geographic, DeLorme, NAVTEQ, and Esri



EMODnet



European Marine
Observation and
Data Network

Query tool 2.0 prototype

The screenshot displays the EMODnet Query tool 2.0 prototype interface. The browser address bar shows the URL `localhost:1234/index.html`. The page header includes the EMODnet logo and the text "CENTRAL PORTAL" with the tagline "Your gateway to marine data in Europe".

The main interface features a map of the North Sea region with a blue rectangular query area. A coordinate box above the map shows the following values:

- Latitude: Min Max
- Longitude: Min Max

The map displays several data points: a red point, a cyan point, a blue point, a green point, and a yellow point. The interface includes a "Data sources" panel on the right with the following categories:

- Bathymetry
- Seabed Habitats
- Biology
- Chemistry
- Geology
- Human Activities** (highlighted)
- Physics

The "Human Activities" panel is expanded, showing:

- Windfarms

The "Statistics" panel on the right provides detailed information for the selected query area (Area: 2220.35 km²):

- Human Activities**
 - 50 % Authorised
 - 37.5 % Production
 - 12.5 % Under Construction
- Geology**
 - Seabed Substrates
 - 82.86 % 2. Sand
 - 10.81 % 1. Mud to muddy Sand
 - 5.9 % 3. Coarse substrate
 - 0.43 % 4. Mixed sediment
- Seabed Habitats**
 - Bio Zones
 - 51.32 % Deep circalittoral
 - 47.94 % Shallow circalittoral
 - 0.74 % Infralittoral

A "Download" button is located at the bottom right of the interface.



EMODnet



European Marine
Observation and
Data Network

Query tool 2.0 prototype – report

Building block for Environmental Impact Assessment (EIA)

10/30/2018 Open Sea Lab

EMODnet | **CENTRAL PORTAL**
Your gateway to marine data in Europe

Statistics

Geology

Seabed Substrates

- 81.67 % 2. Sand
- 10.99 % 1. Mud to muddy Sand
- 7.06 % 3. Coarse substrate
- 0.28 % 4. Mixed sediment

Area: 4170.71 km²

Seabed Habitats

Combined

- 41.99 % A5.27: Deep circallitoral sand
- 38.4 % A5.25 or A5.26: Circallitoral fine sand or circallitoral muddy sand
- 9.97 % A5.35 : Circallitoral sandy mud

Print dialog: Print, Total: 2 pages, Destination: Save as PDF, Pages: All, Layout: Portrait, More settings, Print using system dialog... (Ctrl+Shift+P)

URL: localhost:1234/index.html

Page number: 1/2










EMODnet



Data scientist

 How to access the EMODnet data directly using *webservices*

 List of the base url's of all thematic portals:

 EMODnet Bathymetry	http://ows.emodnet-bathymetry.eu/ows
 EMODnet Biology	http://geo.vliz.be/geoserver/Emodnetbio/ows
 EMODnet Chemistry	http://emodnet02.cineca.it/geoserver/ows
 EMODnet Geology	http://drive.emodnet-geology.eu/geoserver/EMODnetGeology/ows
 EMODnet Human Act	http://www.emodnet-humanactivities.eu/geoserver/emodnet/ows
 EMODnet Physics	http://geoserver.emodnet-physics.eu/geoserver/emodnet/ows
 EMODnet Seabed Hab	https://ows.emodnet-seabedhabitats.eu/ows

WMS

GetCapabilities
GetMap
Getfeatureinfo

WFS

GetCapabilities
DescribeFeatureType
GetFeature

WCS

GetCapabilities
DescribeCoverage
GetCoverage



Data scientist

EMODnet



Examples of implementation in *R*, *Python*
= *hackaton package*

```

# library(data.table)
# library(sf)

# list the parts of the wfs url
base_url <- 'http://geo.vliz.be/geoserver/ows'
service <- '?request=GetFeature&service=WFS&version=1.1.0'
typeName <- '&typeName=Dataportal:euobis'
resultType <- '&resultType=results'
viewParams <- '&viewParams=context:0100;'
paramAphia <- paste0('aphiaid:', aphiaid$AphiaID)
paramGeo <- paste0('where:(up.geobjectsids && ARRAY[' , mrgid$MRGID, ' ]')')
outFormat <- '&outputFormat=csv'

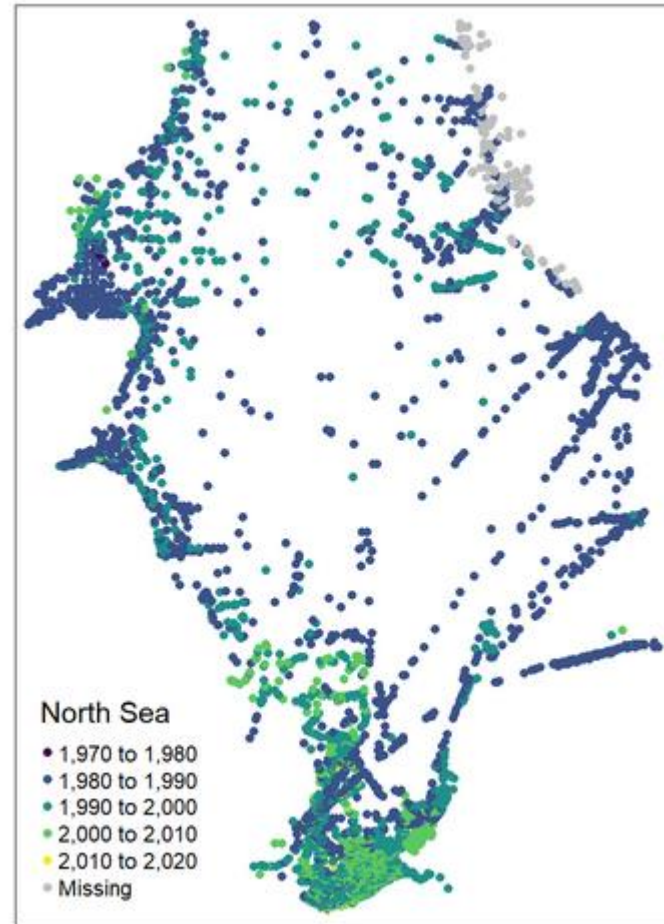
# combine to wfs url, providing the AphiaID and the MRGID
csv_url <- paste0(base_url, service, typeName, resultType,
                 viewParams,
                 URLEncode(paste(paramAphia, paramGeo, sep=';'), reserved = TRUE),
                 outFormat)

# get the csv directly by the webservice url
Larus_fuscus_NZ_web <- fread(csv_url,
                             header = TRUE,
                             sep = ';')

# but you can also directly get the spatial data:
wfs_url <- paste0(base_url, service, typeName,
                 viewParams,
                 URLEncode(paste(paramAphia, paramGeo, sep=';'), reserved = TRUE),
                 '&outputFormat=application/json')

Larus_fuscus_NZ_web_sf <- st_read(wfs_url)

```





EMODnet



European Marine
Observation and
Data Network

Open Sea Lab



15-17 November 2017 De Serre, Antwerp, Belgium





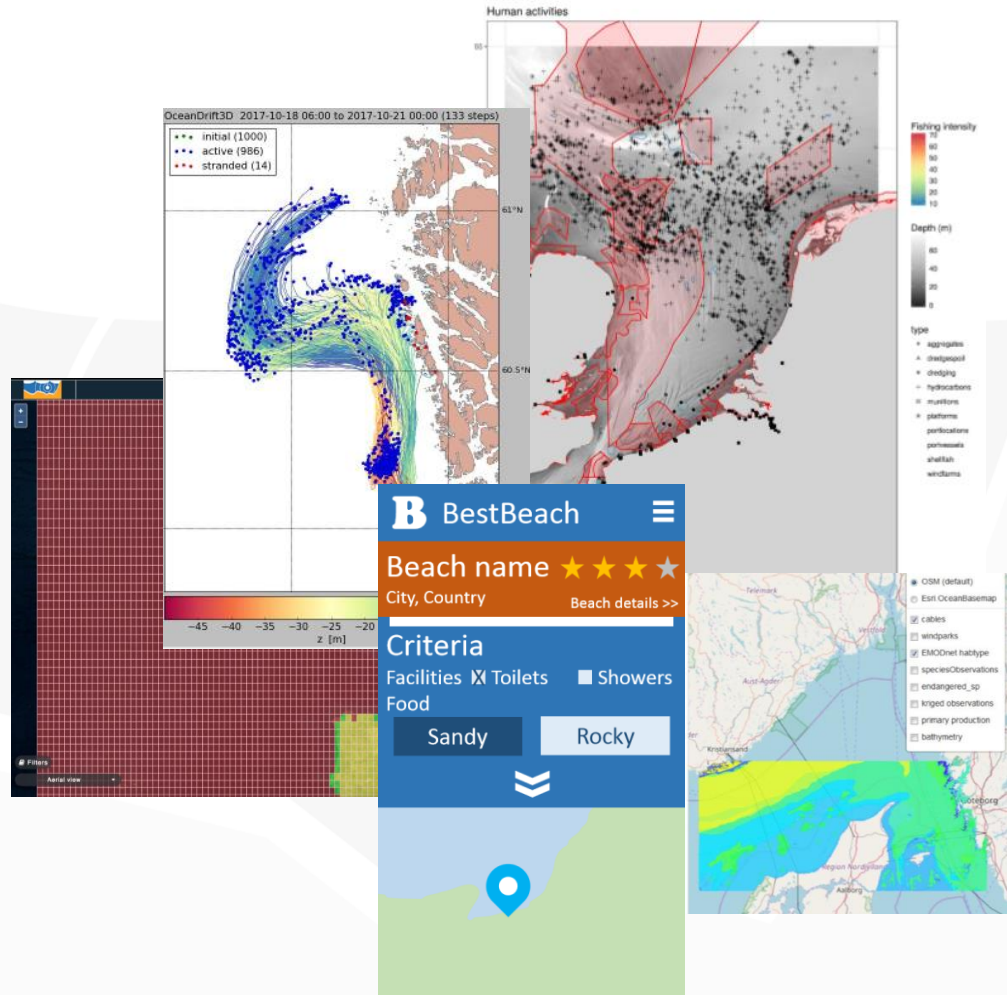
EMODnet



OSL 1: 7 teams with exciting challenges

Tackling the following domains:

-  Fisheries
-  Energy
-  Tourism
-  Environment
-  Aquaculture





Team 3 (ImarDis)

EMODnet



📡 winners of 'Best Pitch', produced a tool for scuba divers to identify where to dive for wrecks. Users would be able to identify suitable wreck dive sites based on a range of parameters.



Tourism



EMODnet

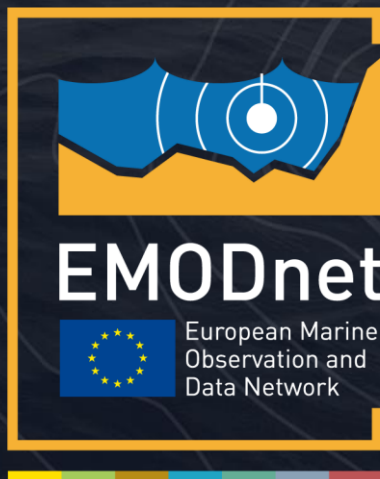


European Marine
Observation and
Data Network

Open Sea Lab 2: the story continues

Autumn 2019, city of Antwerp!





@EMODnet

www.emodnet.eu

Your gateway to marine data in Europe