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European Marine Observation and Data Network

Your gateway to marine data in Europe

EMODnet Central Portal data services

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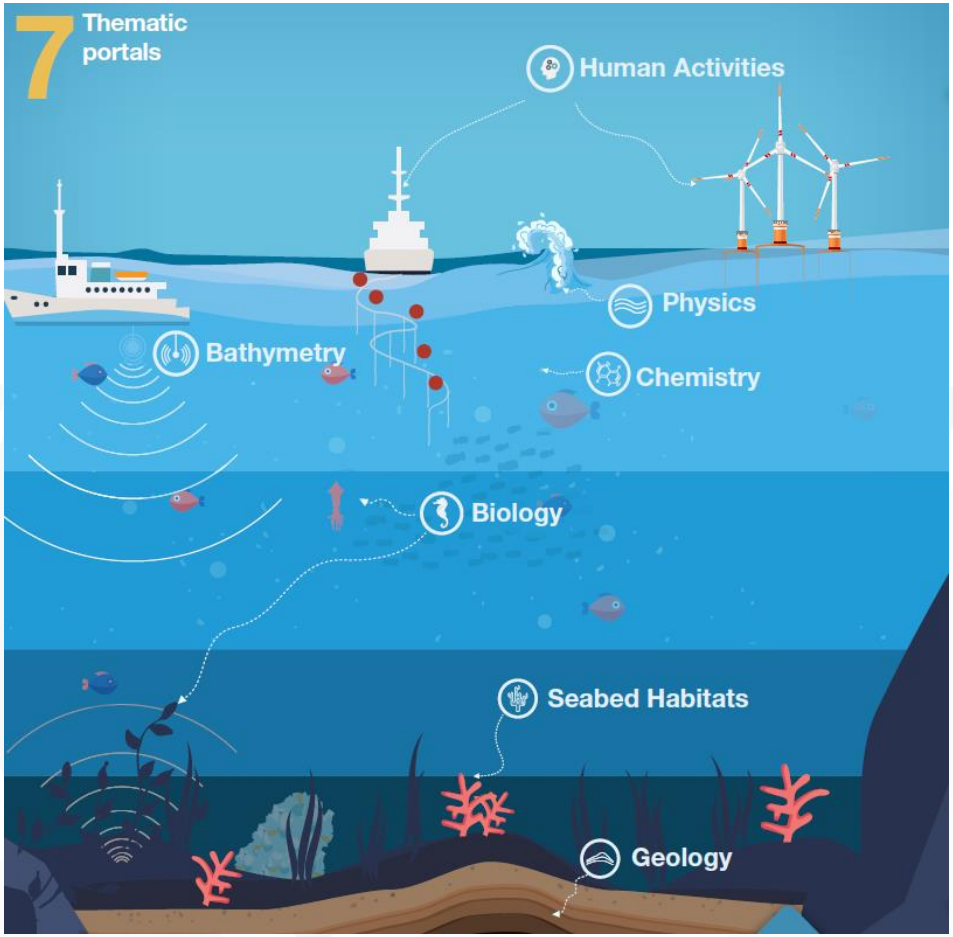
What is EMODnet?

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



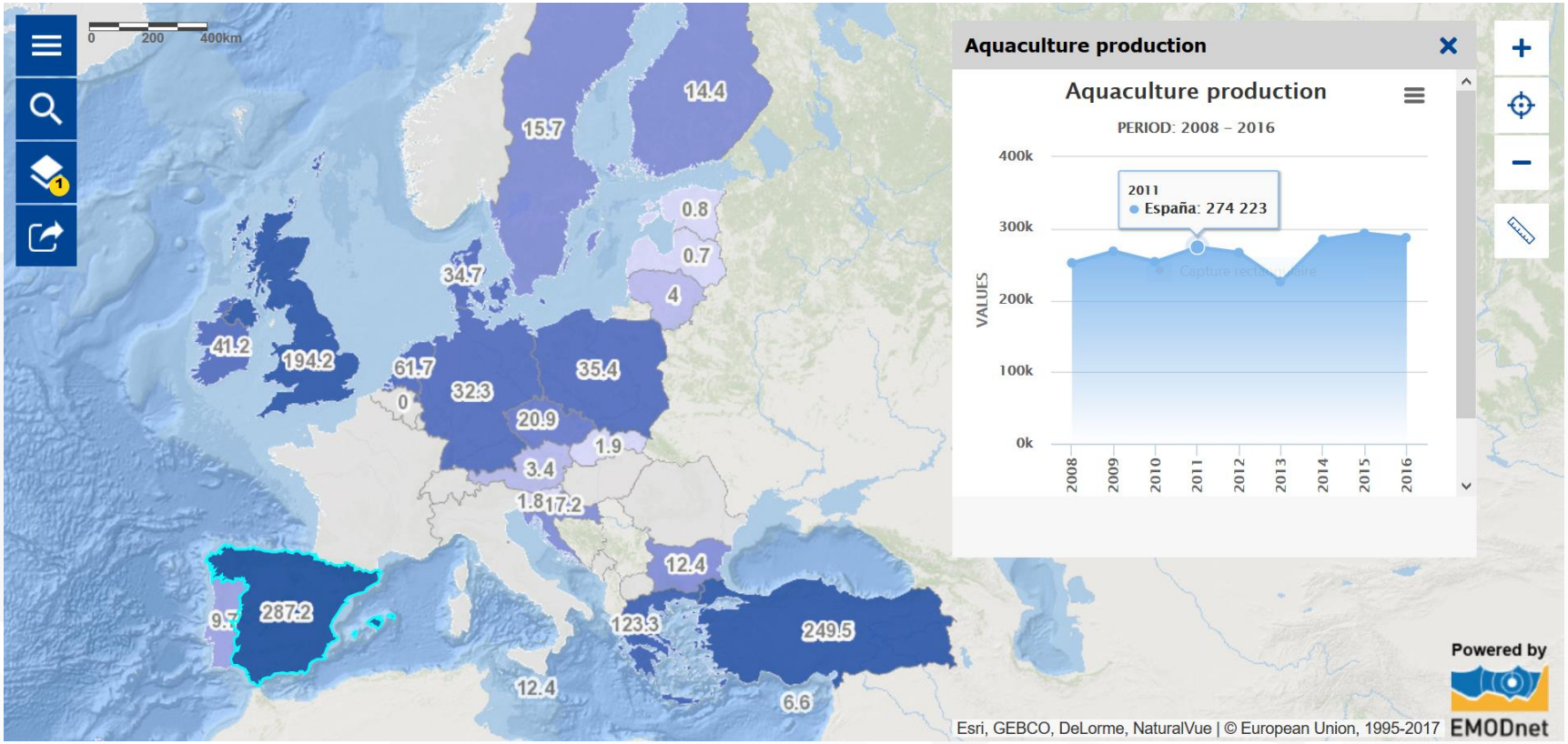
Objectives EMODnet Central Portal

- 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 Central Portal & data services

- Different services for different users
  - General 'professional' user: overview of the data products though 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

European Atlas of the Seas



Ex: Aquaculture production (2008 to 2016)

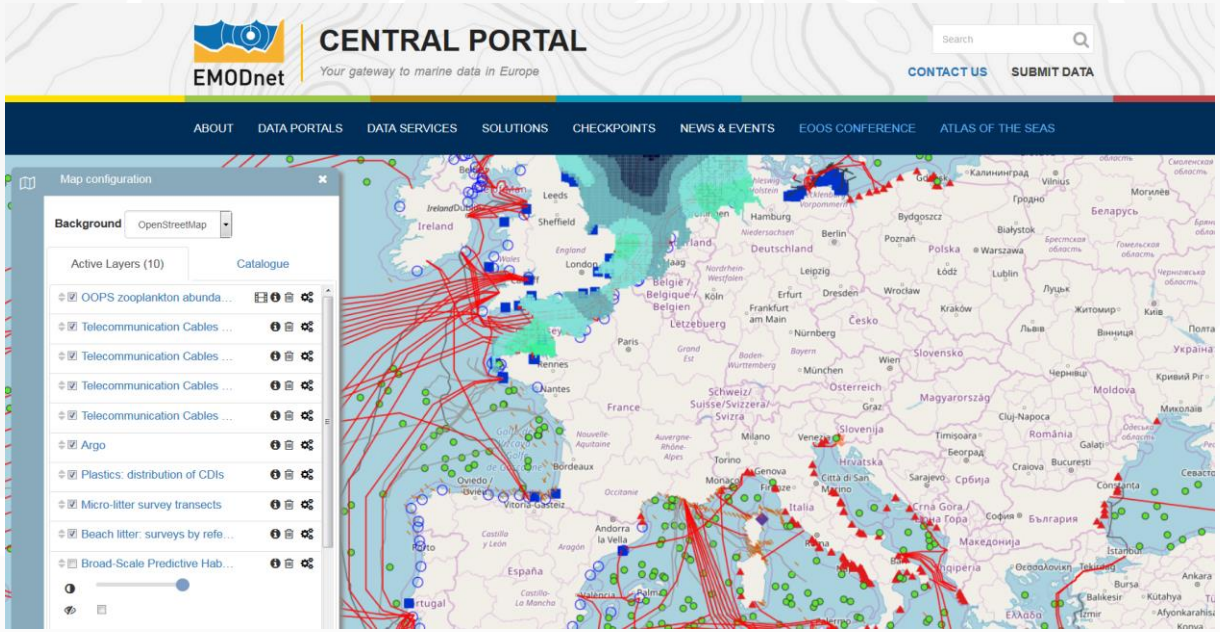
Informative, educational, simple and playful

General ‘professional’ user

- Overview of the data products though 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

General ‘professional’ user

- Overview of the data products though 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)



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

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

Data services (II): Query tool 2.0

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Current developments

FRONT END

Web application – query tool (JS/HTML)

- New layout
- Extra functionality: map where user can indicate areas

R- shiny application

Other clients

Prototype of web application

Html template report

REST API Calls

INPUT: area

OUTPUT: Summary/stats Map Raw data

BACKEND

REST API

PROCESSING WEBSERVICE
Clipping EMODnet OGC layers (WFS, WMS, WCS)

OGC layers = relevant data products from:

Bathymetry | Geology | Biology | Chemistry

Physics | Seabed habitats | Human activities

Clip polygon layers from Geology Seabed habitats

Testing for Bathymetry

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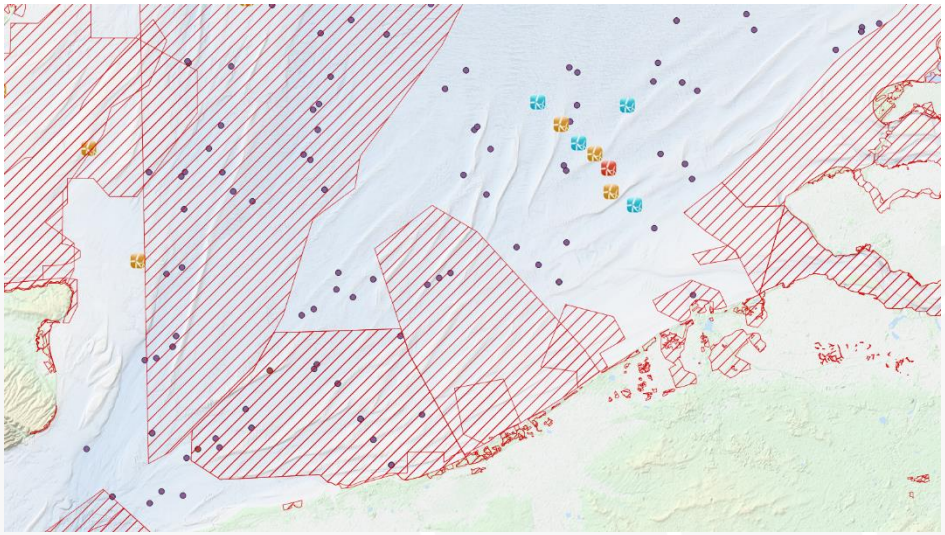
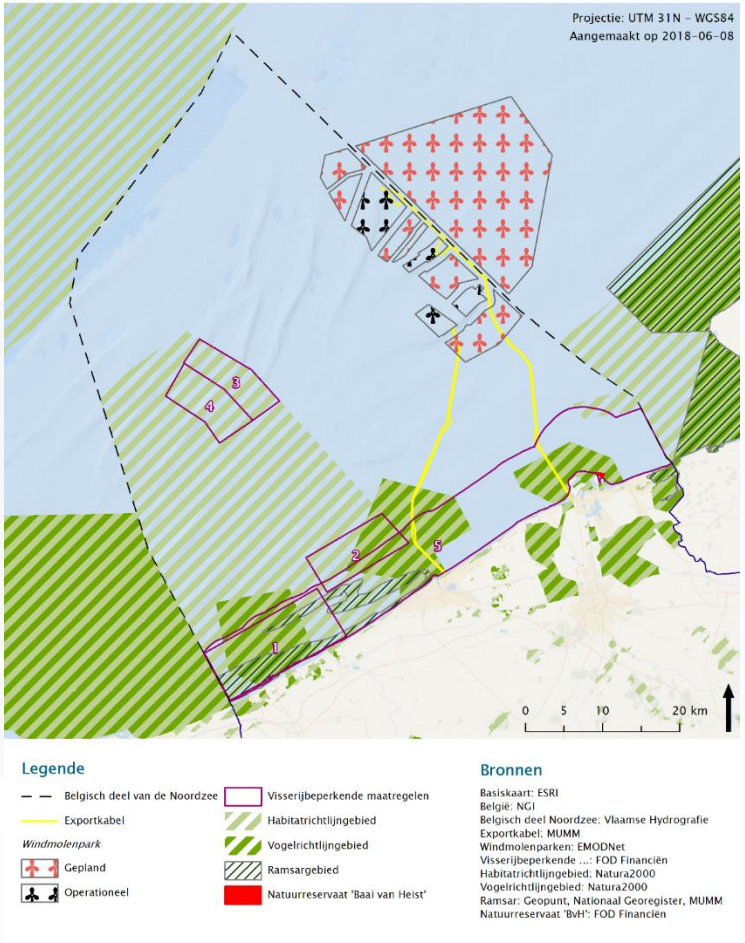
Query tool 2.0 prototype





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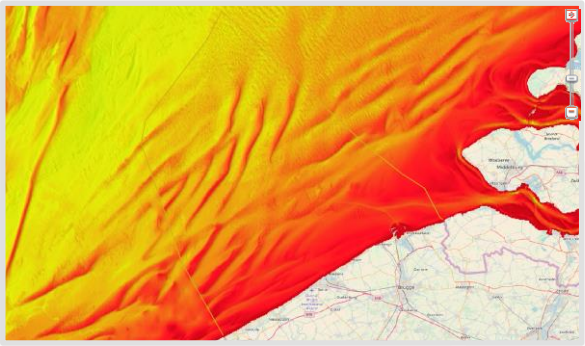
Valuable information from data products

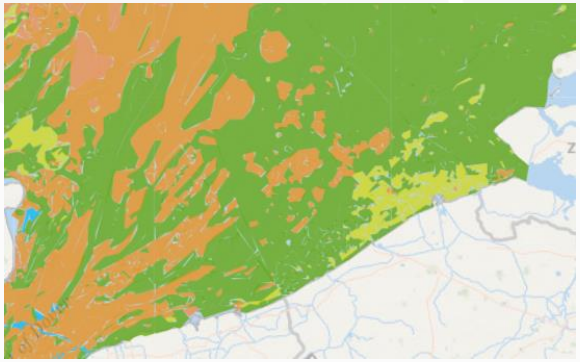
Bathymetry



Mean depth

- Average depth of selected area
- Minimum depth of selected area
- Maximum depth of selected area

Geology

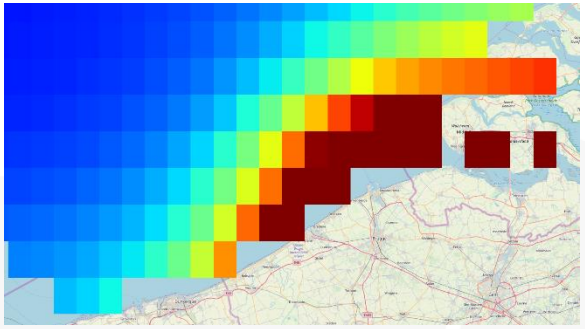


Seabed substrate 250k

% of substrate type in selected area

Valuable information from data products

Chemistry

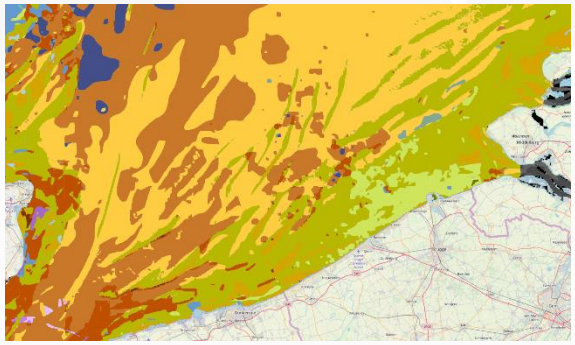


Concentrations of ammonium, Chla-a, dissolved oxygen, phosphate and silicate, averaged per season, at different depths

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

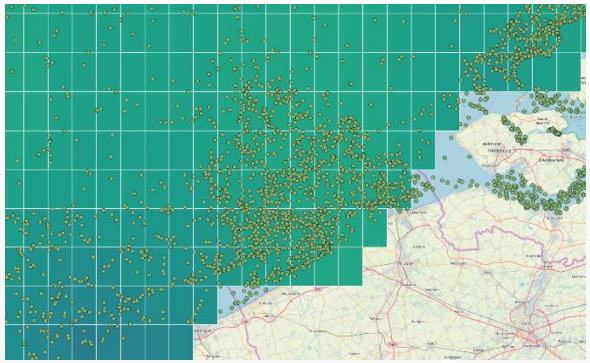


Broad-Scale Predictive habitat Map

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

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

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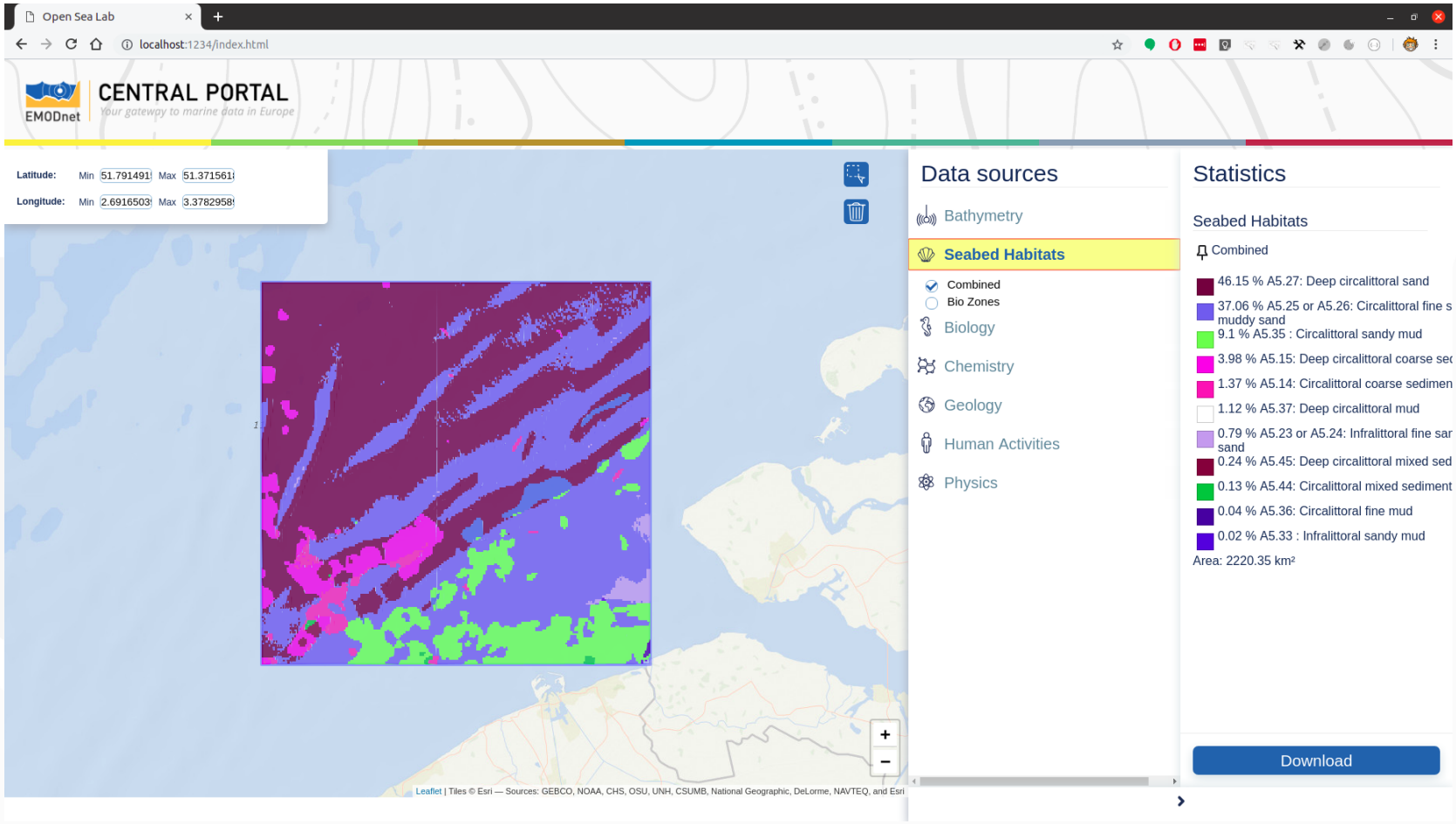
Query tool 2.0 prototype



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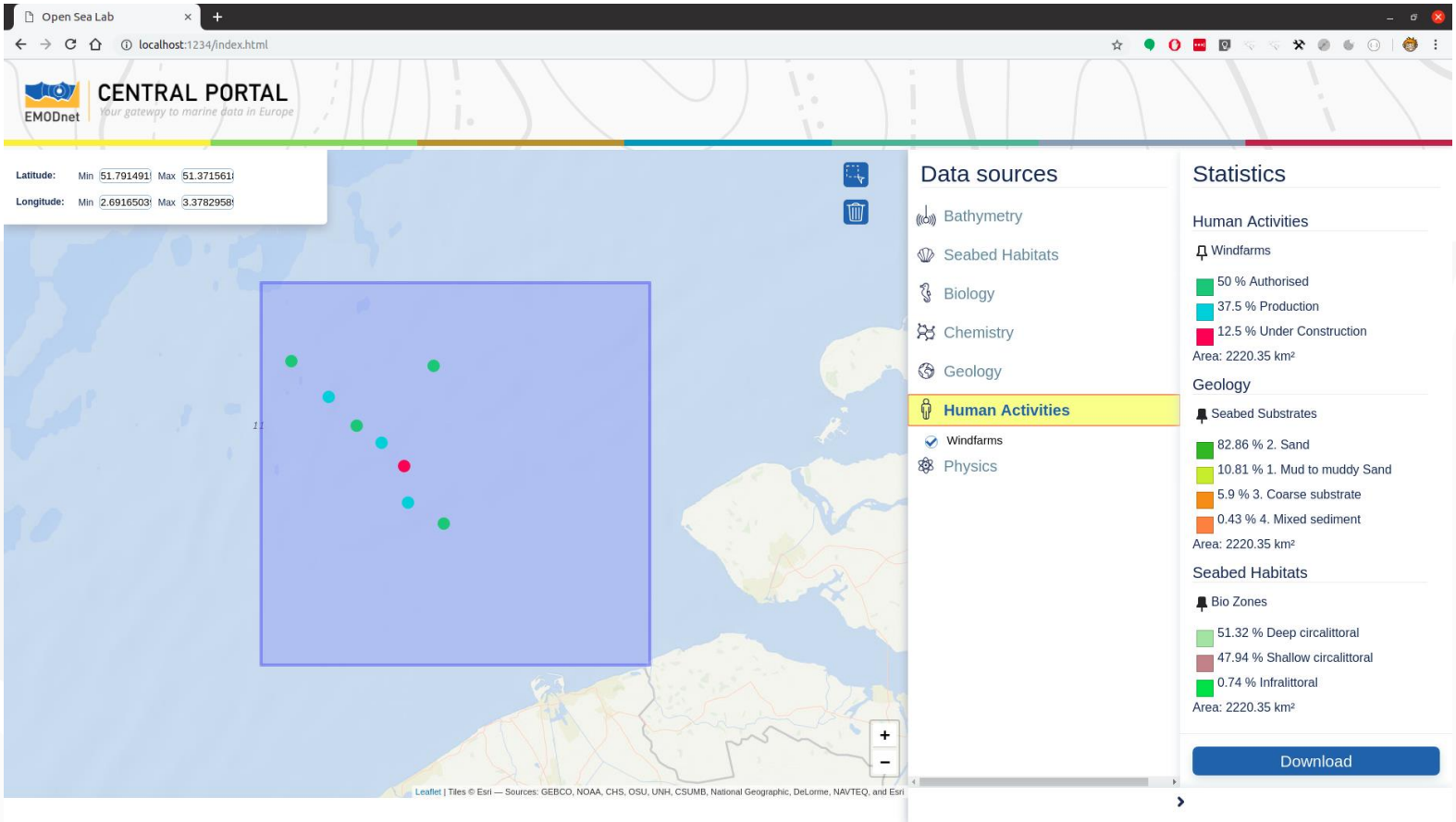

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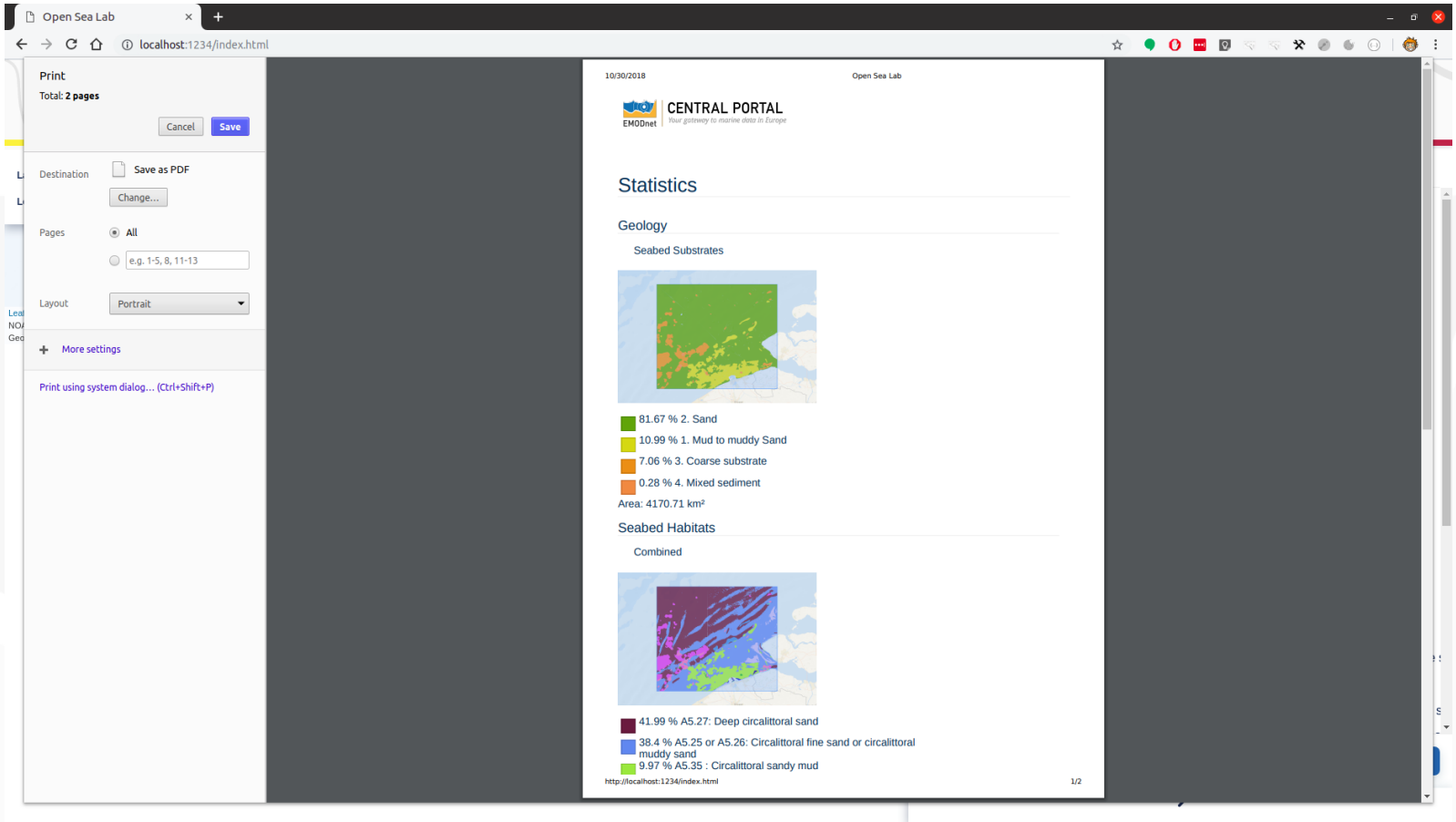
Query tool 2.0 prototype – report

Building block for Environmental Impact Assessment (EIA)



Data scientist

- How to acces 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

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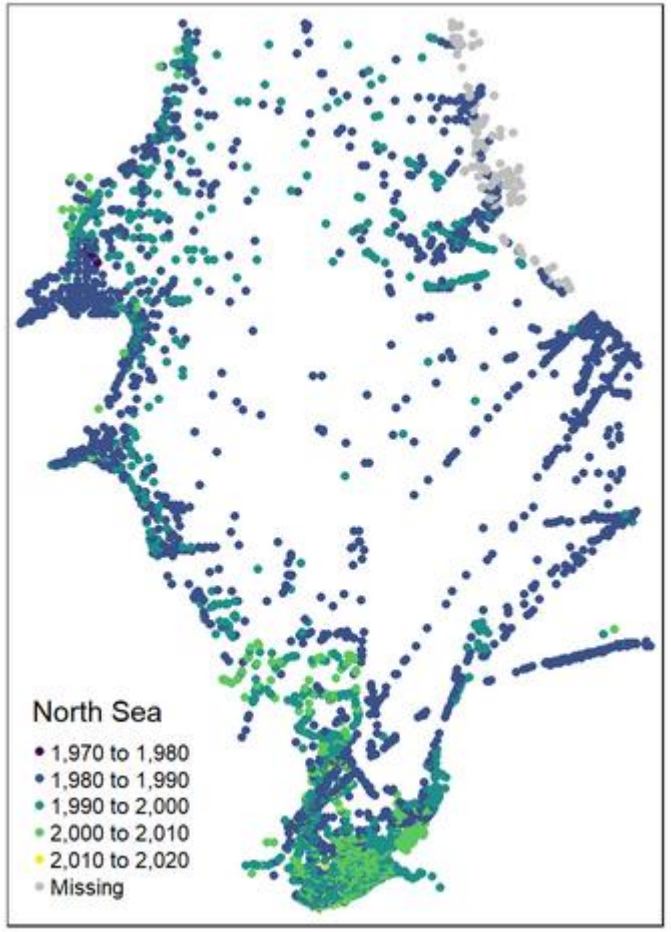
Examples of implementation in *R*, *Python*
= hacketon package

```
# 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:eurobis'
resultType <- '&resultType=results'
viewParams <- '&viewParams=context:0100;'
paramAphia <- paste0('aphiaid:', aphiaid$AphiaID)
paramGeo   <- paste0('where:(up.geoobjectsids && ARRAY[', mrgid$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)
```



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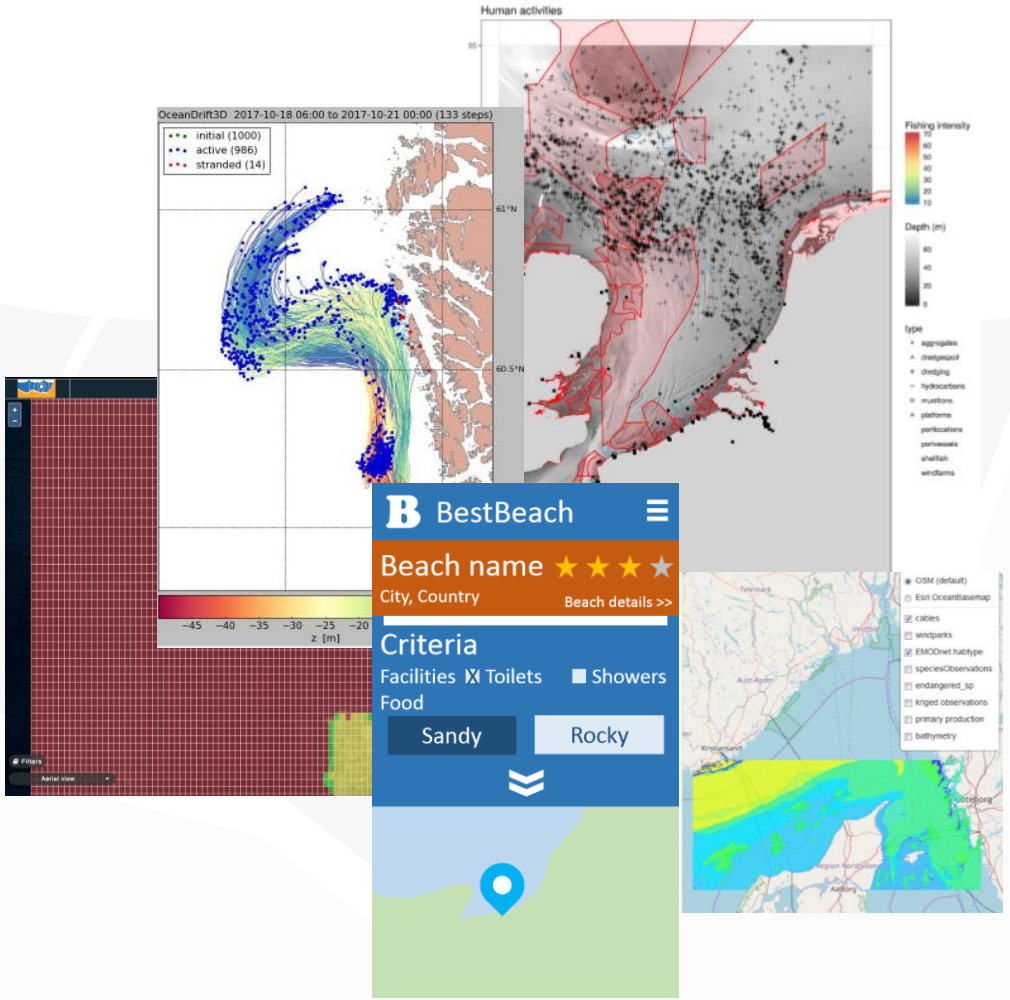
Open Sea Lab

EMODnet OPEN SEA LAB
INNOVATION
CO-CREATION
IDEATION
HACKATHON
OPEN-DATA
15-17 November 2017 De Serre, Antwerp, Belgium

OSL 1: 7 teams with exciting challenges

Tackling the following domains:

- Fisheries
- Energy
- Tourism
- Environment
- Aquaculture



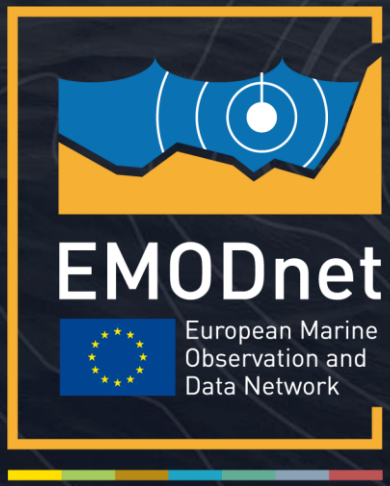
Team 3 (ImarDis)

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

Open Sea Lab 2: the story continues

Autumn 2019, city of Antwerp!



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