Valorisation of H2020 ATLAS data and data products using EMODnet, EAS and related open source data platforms

ATLAS project GA, 1-4 April 2019

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www.eu-atlas.org

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Talk overview

I. **Why does open access to marine data matter?**

II. **What is EMODnet?**

III. **Highlights from EMODnet Phase III**

-Data products, use cases, data ingestion;

-European Atlas of the Seas.

IV. **Valorisation of H2020 ATLAS data and data products:**

- EMODnet – Atlantic developments

- Enabling transfer of ATLAS knowledge: data ingestion to EMODnet

- Online community page: EMODnet Central Portal

V. **H2020 ATLAS GIS platform:**

- Choosing an open source GIS staging environment;

- Technical development and visualizing data + data products.

VI. **Next steps:** Within and beyond H2020 ATLAS

I. Why does open access to marine data matter?

Sound ocean data is indispensable if we want to tackle major global issues such as climate change, marine litter, illegal fishing or marine protection. It is also a bare necessity if we want to develop the blue economy and create sustainable economic growth in the EU.

***Karmenu Vella**, European Commissioner for Environment, Maritime Affairs and Fisheries*

#EOOSConference18

European Commission

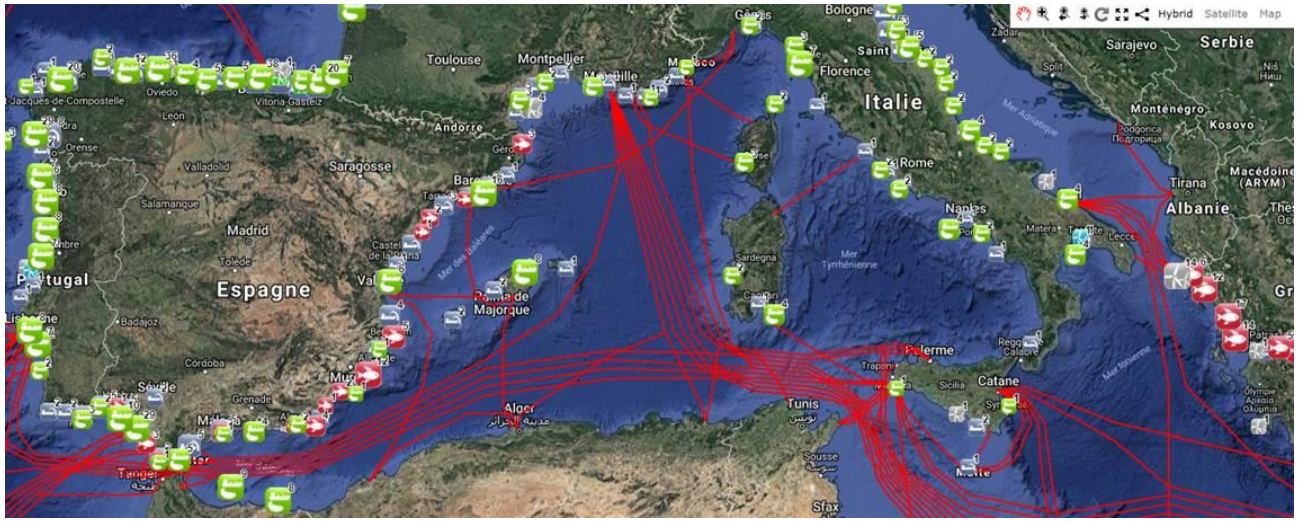
Conference Report coming soon!
http://www.eoosconference2018.eu/

I. Why does open access to marine data matter?

Marine data should be Findable, Accessible, Interoperable and Reusable (FAIR) across multiple parameters, spatial scales and resolutions:

-To promote a knowledge-driven, ocean literate society;

-To enable the blue economy and to set appropriate, evidence-based management plans to achieve good environmental status



Map from EMODnet Human Activities portal

II. What is the European Marine Observation and Data Network (EMODnet)?

Unlocking the knowledge in marine data and observations

EMODnet

- Industry (marine/maritime)
- Research
- Informed policy and environmental management
- Assessing, forecasting and risk prevention
- Informed society

Users feedback on needs and requirements to improve ocean observation, data collection and products

And they are often data providers too…….

II. What is the European Marine Observation and Data Network (EMODnet)? Evolution

A long-term initiative of the European Commission (DG MARE) from 2009 onwards

2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Phase I – Limited sea basins											
				Phase II – Low resolution all basins							
								Phase III – Multi-resolution			

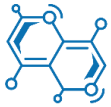
- Phase 1 — 59 institutions, budget €6.45 million
  - Prototype of Thematic data portals
  - Limited selection of parameters and sea-basins
  - Low-resolution data products
- Phase 2 — 120 institutions, budget €16.3 million
  - More parameters, and coverage of all European sea-basins
  - Medium-resolution data products
  - Establishment Central Portal & Sea-basin Checkpoints
  - Launch Secretariat
- **Phase 3** — >150 institutions, budget €20 million
  - Multi-resolution digital map of entire European seabed by 2020
  - EU Atlas of the Seas and contribution to EOOS

II. What is EMODnet?
5 strands by >160 organisations

EMODnet
European Marine Observation and Data Network

- 7 thematic data portals
- Central Portal www.emodnet.eu
- 6 Sea-basin Checkpoints
- Data Ingestion Facility
- Secretariat


BIOLOGY


CHEMISTRY


PHYSICS


HUMAN ACTIVITIES


GEOLOGY

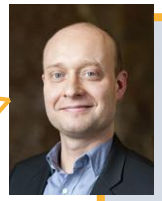

BATHYMETRY


SEABED HABITATS

II. What is EMODnet? Secretariat

seascape BELGIUM

WP0 - Project management
Jan-Bart Calewaert & Kate Larkin



WP1 - Promote coherence
J-B Calewaert

Tim Collart, starting 1 May 2019

Core Secretariat (Oostende, Belgium)

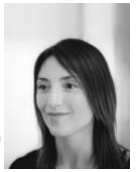
WP4 - EOOS
Kate Larkin

European MARINE BOARD
Advancing Seas & Ocean Science

WP2 -Monitoring output
Nathalie Tonné

Trust-IT Services
Communicating ICT to markets

WP3 - Communication and outreach
Andrée-Anne . Marsan



WP5 - European Atlas of the Seas
Pascal Derycke (Technical Coordinator)

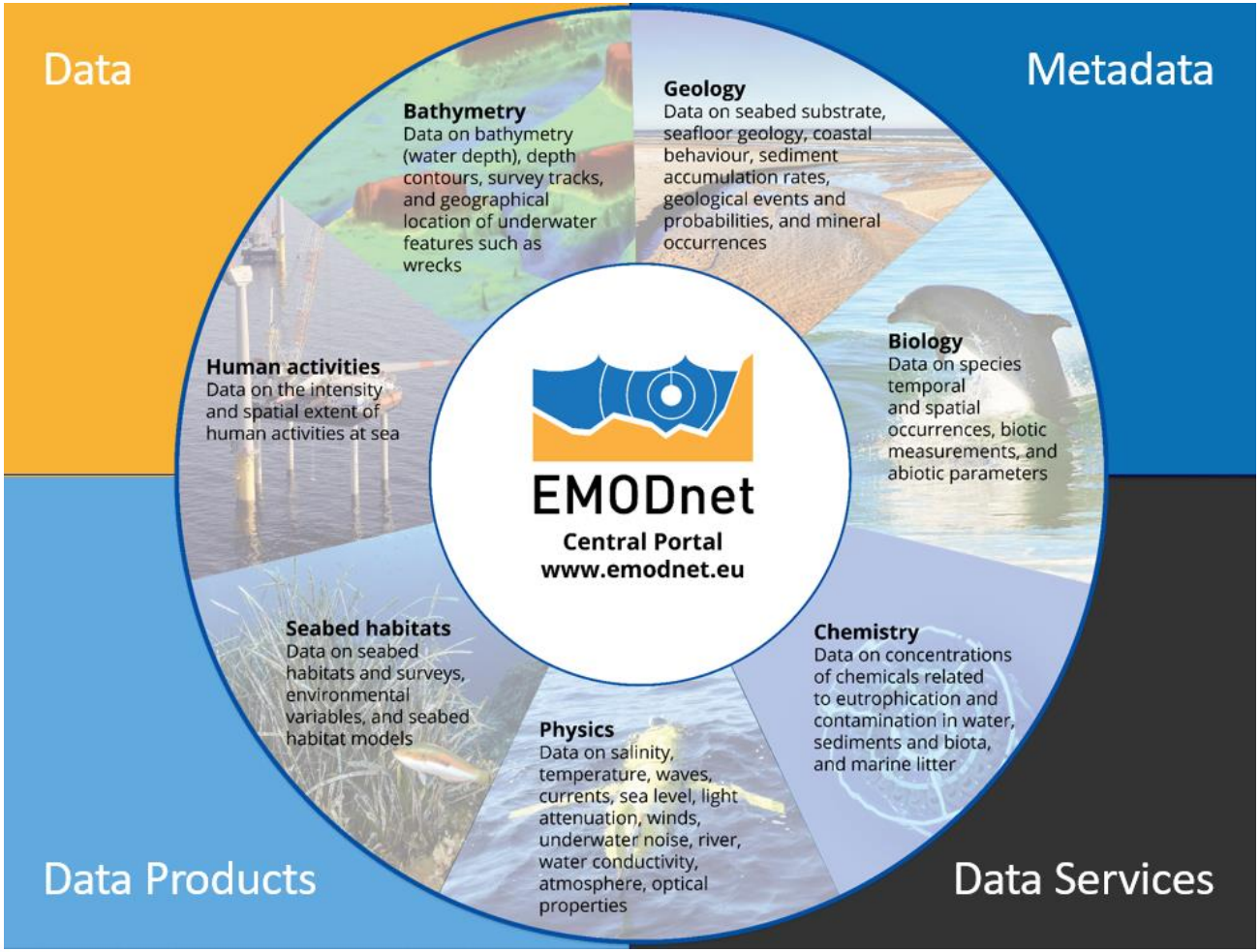
Bilbomática

seascape consultants ltd

Remote support (Romsey, UK)

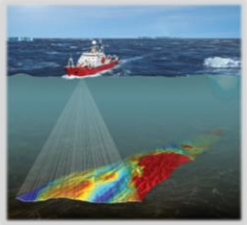
II. What is EMODnet?

An open access marine data and knowledge broker



III. EMODnet Phase III: Data

Bathymetry



Survey tracks

Water depth and depth profiles

Undersea features

Wrecks

High resolution bathymetry in coastal areas

Geology

Seabed substrate

Sediment accumulation rates

Seafloor lithology

Seafloor stratigraphy

Coastal behaviour

Geological events and probabilities

Mineral occurences

Seabed habitats

Seabed habitat maps (broad-scale and specific per basin)

Individual seabed habitat maps from surveys

Environmental variables influencing habitat type (depth, salinity, currents, light, ...)

Physics

Wave height and duration

Sea temperature

Wind speed and direction

Salinity

Horizontal speed of the water column

Water clarity

Changes in sea level

Inflow from rivers

Water conductivity / biochemical parameters

Atmospheric parameters

Underwater noise

Chemistry

Acidity

Antifoulants

Chlorophyll

Dissolved gases

Fertilisers

Hydrocarbons

Marine litter
Heavy metals

Organic matter

Polychlorinated biphenyls

Pesticides and biocides

Radionuclides

Silicates

Biology

Occurrences and abundances of species of:

Phytoplankton

Zooplankton

Macro-algae

Angiosperm

Fish

Reptile

Benthos

Bird

Sea mammal

Human activities

Aggregate extraction

Aquaculture

Cultural heritage

Dredging

Fisheries

Hydrocarbon extraction

Traffic in main ports

Ocean energy facilities

Pipelines and cables

Protected areas

Status of bathing sites

Vessel density

Waste disposal (solids)

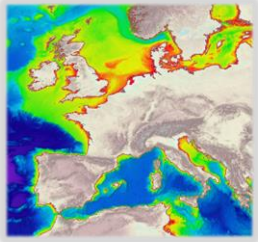
Wind farms

Other forms of area management/ designation

III. EMODnet Phase III: Data products

atlas

Bathymetry



Digital Terrain Model of:

Survey tracks

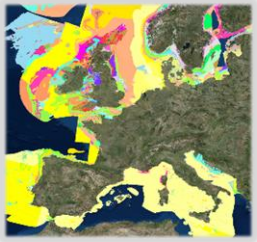
Water depth and depth profiles

Undersea features

Wrecks

High resolution bathymetry in coastal areas

Geology



Maps of:

Multiscale Seabed substrate

Sediment accumulation rates

Seafloor lithology

Seafloor stratigraphy

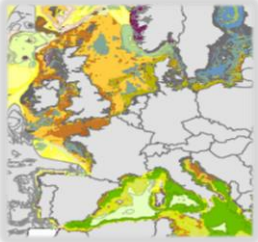
Coastal behaviour and coastline migration

Geological events and probabilities

Mineral occurences

Submerged landscapes

Seabed habitats



EMODnet broad-scale seabed habitat map for Europe (EUSeaMap)

Confidence maps

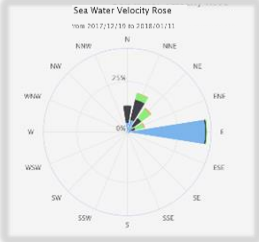
Maps of:

Seabed habitat maps (broad-scale and specific per basin)

Individual seabed habitat maps from surveys

Environmental variables influencing habitat type (depth, salinity, currents, light, ...)

Physics



Time series

Dynamic plots

Profiles

Statistics (trends, max, min, average, ...)

Maps of:

Wave height and duration

Sea temperature

Wind speed and direction

Salinity

Horizontal speed of the water column

Water clarity

Changes in sea level

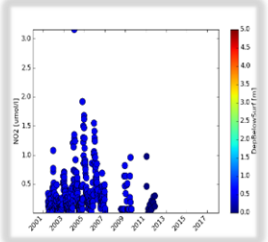
Inflow from rivers

Water conductivity/biogeochemical parameters

Atmospheric parameters

Ice cover

Chemistry



Concentration maps using DIVA software

Dynamics plots

Profiles of:

Acidity

Antifoulants

Chlorophyll

Dissolved gases

Fertilisers

Hydrocarbons

Heavy metals

Organic matter

Polychlorinated biphenyls

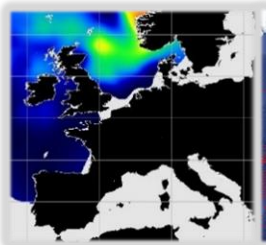
Pesticides and biocides

Radionuclides

Silicates

Marine litter (micro, beach, seafloor)

Biology



Map viewer of:

Phytoplankton

Zooplankton

Macro-algae

Angiosperm

Fish

Reptile

Benthos

Bird

Sea mammal

Dynamic gridded abundance plots showing geographical variability of species:

Benthos

Birds

Fish

Sea mammals

Micro-organisms

Physoplankton

Reptiles

Zooplankton

Human activities

Map viewer of:

Aggregate extraction

Aquaculture

Cultural heritage

Dredging

Fisheries

Hydrocarbon extraction

Traffic in main ports

Ocean energy facilities

Pipelines and cables

Protected areas

Status of bathing sites

Vessel density

Waste disposal (solids)

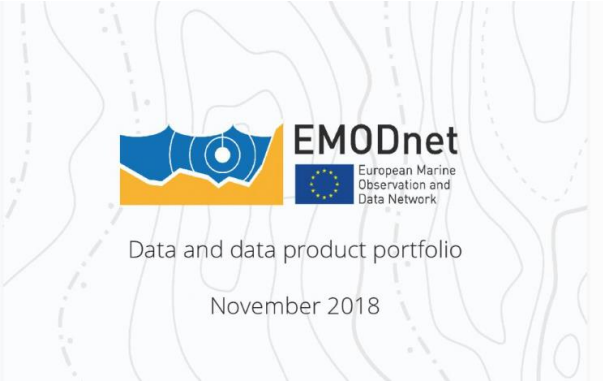
Wind farms

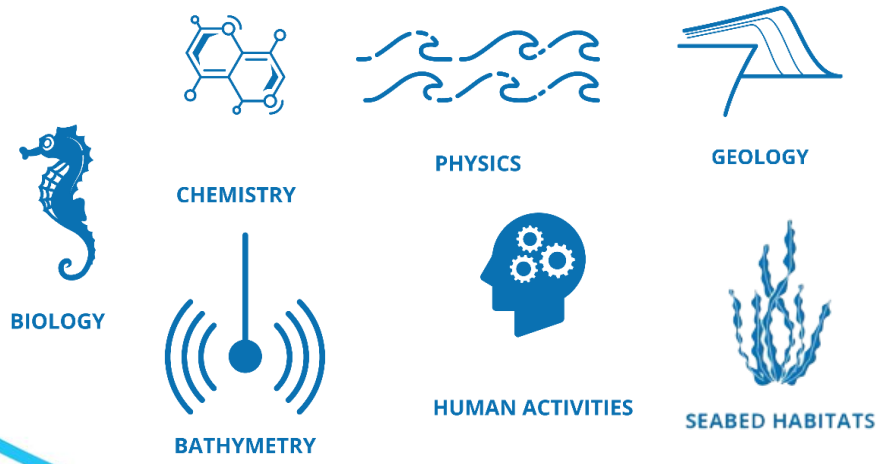
Other forms of area management/ designation

http://www.emodnet.eu/data-portfolio

III. Highlights from EMODnet Phase III

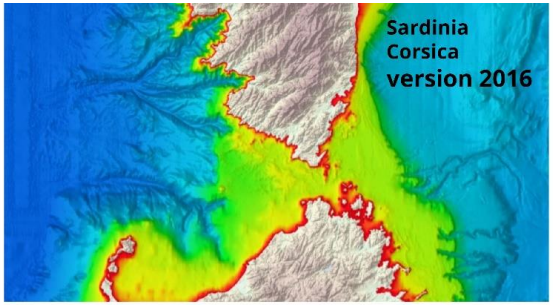
Data and data products: Portfolio catalogue

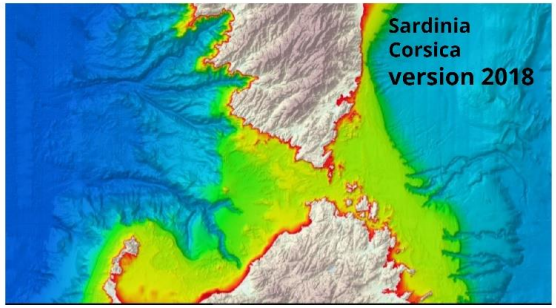




http://www.emodnet.eu/data-portfolio

III. EMODnet Phase III: EMODnet Bathymetry





The advanced EMODnet DTM offers **many benefits** to users:

- resolution increased to 1/16 * 1/16 arc minutes (circa 115*115m);
- powerful 3D visualisation functionality;
- faster representation of the complexity of the map;
- expanded coverage: European seas + European part of the Arctic Ocean and Barents Sea;
- inclusion of Satellite Derived Bathymetry data products, in particular for coastal stretches of Spain and Greece.

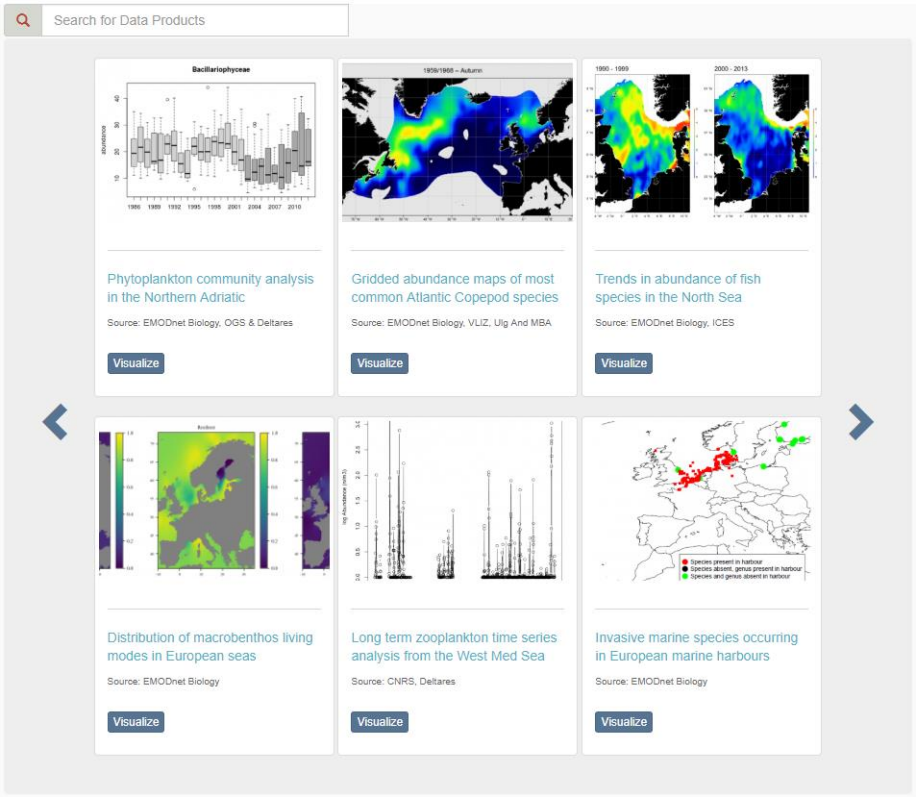
BATHYMETRY

EMODnet
European Marine Observation and Data Network

http://www.emodnet-bathymetry.eu/

III. EMODnet Phase III: EMODnet Biology

- Launched on 19 December 2018
- Range of demand-led data products including tools, models and maps, illustrating the diverse range of outputs that can be generated from EMODnet Biology hosted data.
- Underpinned by EurOBIS data infrastructure
- International contribution and relevance: EMODnet Biology supply >50% of global datasets to OBIS: Fundamental pillar to UN WOA, IPBES etc



www.emodnet-biology.eu/about-atlas

EMODnet
European Marine Observation and Data Network

Portal:
EMODnet Biology

OBIS
OCEAN BIOGEOGRAPHIC INFORMATION SYSTEM

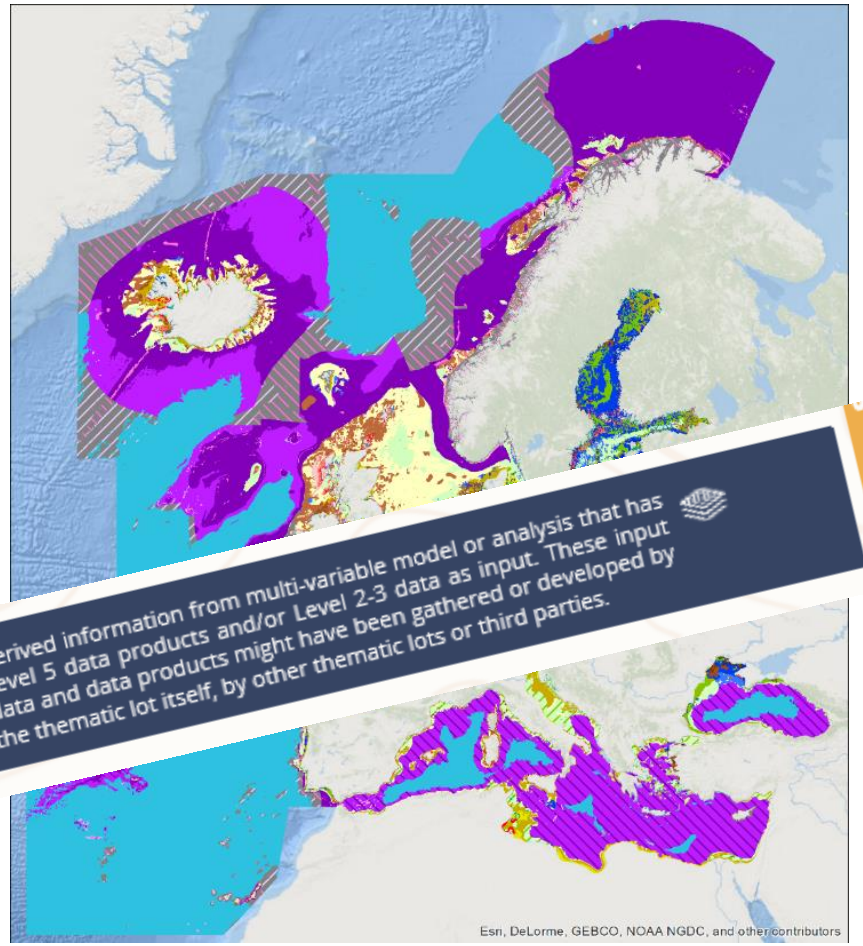
III. EMODnet Phase III

EMODnet Seabed Habitats Broad-scale Map (EUSeaMap)

- Broad-scale European seabed habitat map
- Full coverage of all EU seas
- Time and cost efficient
- Common EUNIS European language for habitat types
- Spatial confidence assessment available

Phase III:

JNCC (lead); 12 partners



SEABED HABITATS

https://www.emodnet-seabedhabitats.eu/

Making EMODnet EUSeaMap

EMODnet
European Marine Observation and Data Network

GEOLOGY

+

PHYSICS

+

SEABED HABITATS BATHYMETRY BIOLOGY

=

SEABED HABITATS

Substrate

E.g. Sand, Mud, Rock

Hydrodynamic Energy

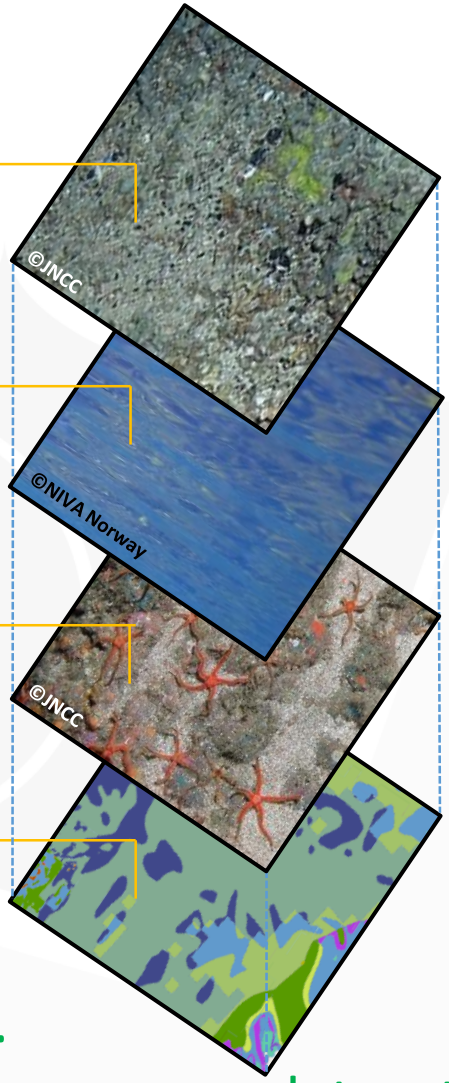
Wave and currents climate at the seabed

Biological Zone

Infralittoral, circalittoral etc

Predictive habitat maps

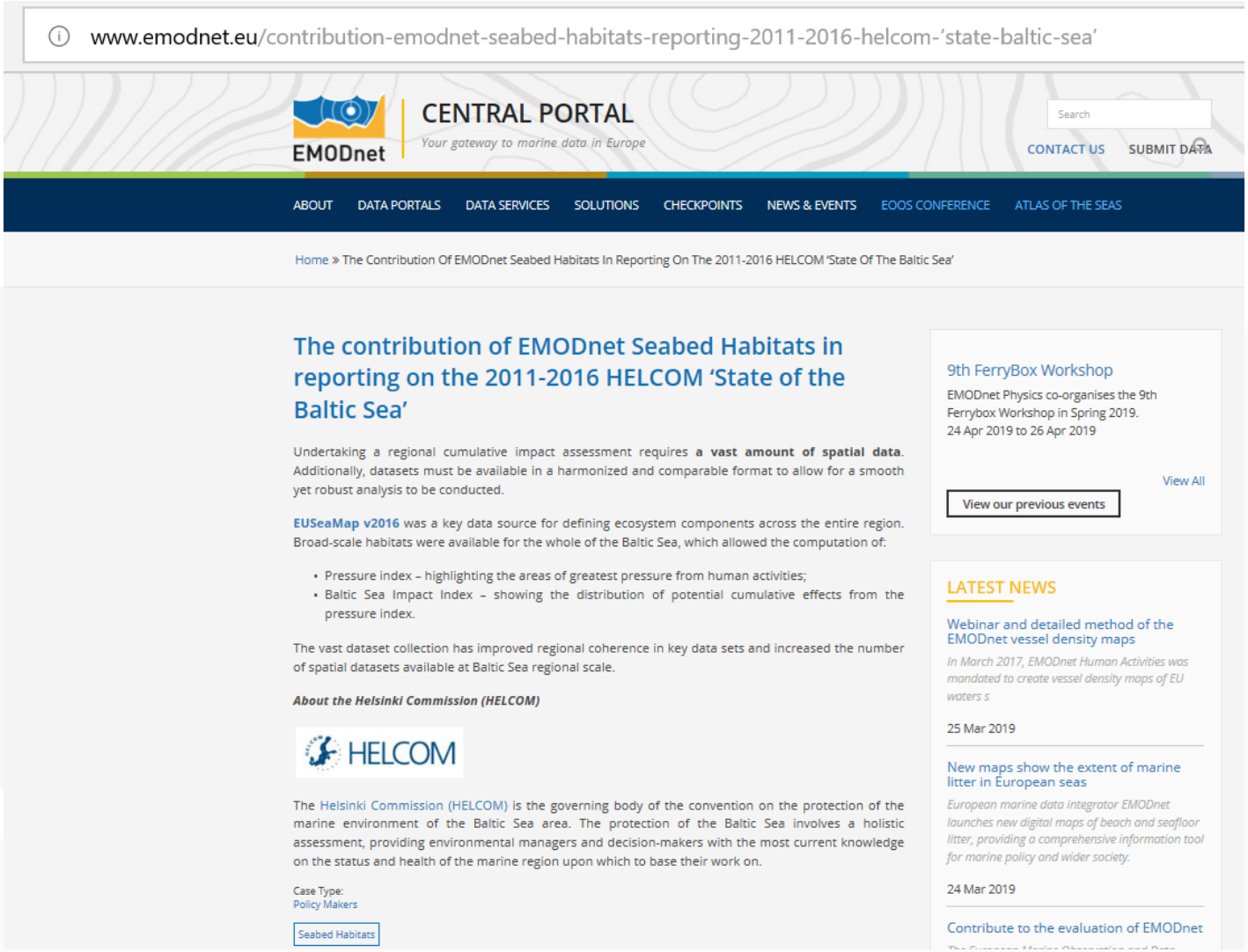
EUNIS A3.1: Atlantic and Mediterranean High Energy Infralittoral Rock



Phase III is increasing spatial coverage.

Could ATLAS case studies fill gaps in open ocean datasets?

EMODnet Seabed Habitat Map
Use case by HELCOM



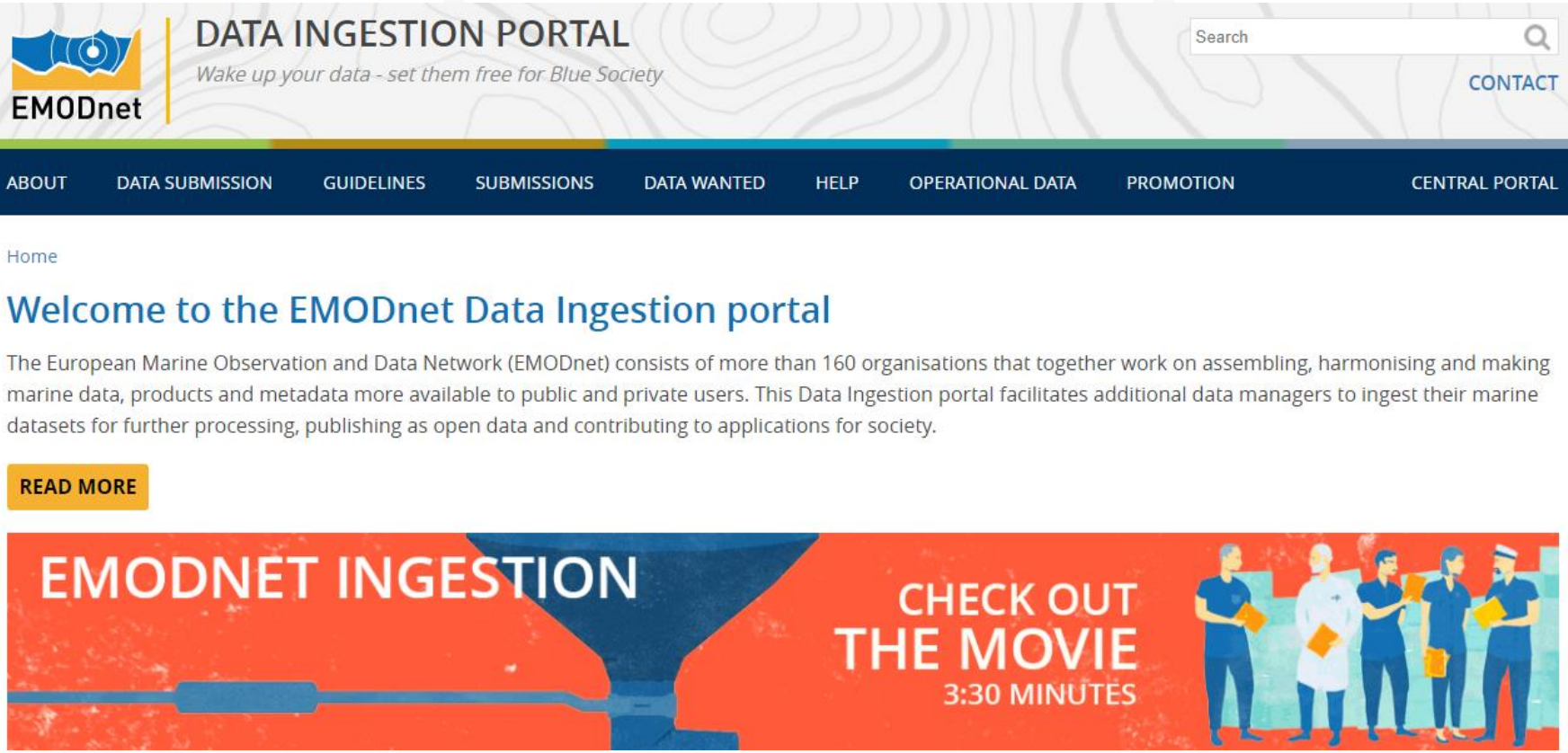
EMODnet
European Marine Observation and Data Network

atlas

Data Ingestion Portal

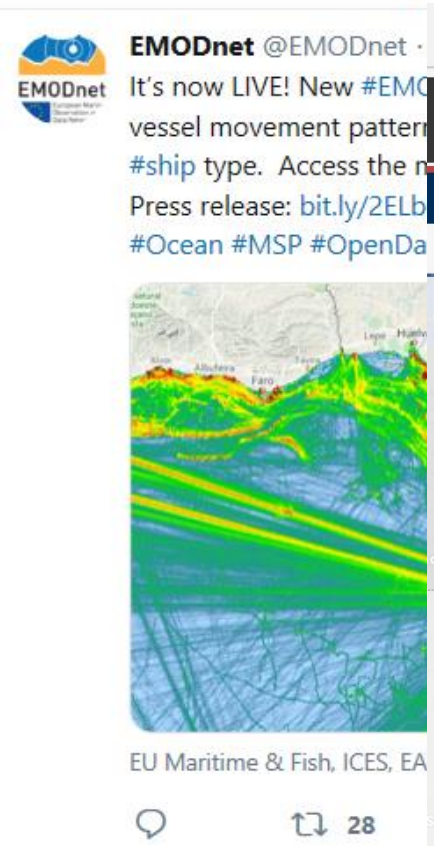
To support all marine data holders to submit data to EMODnet in an easy way

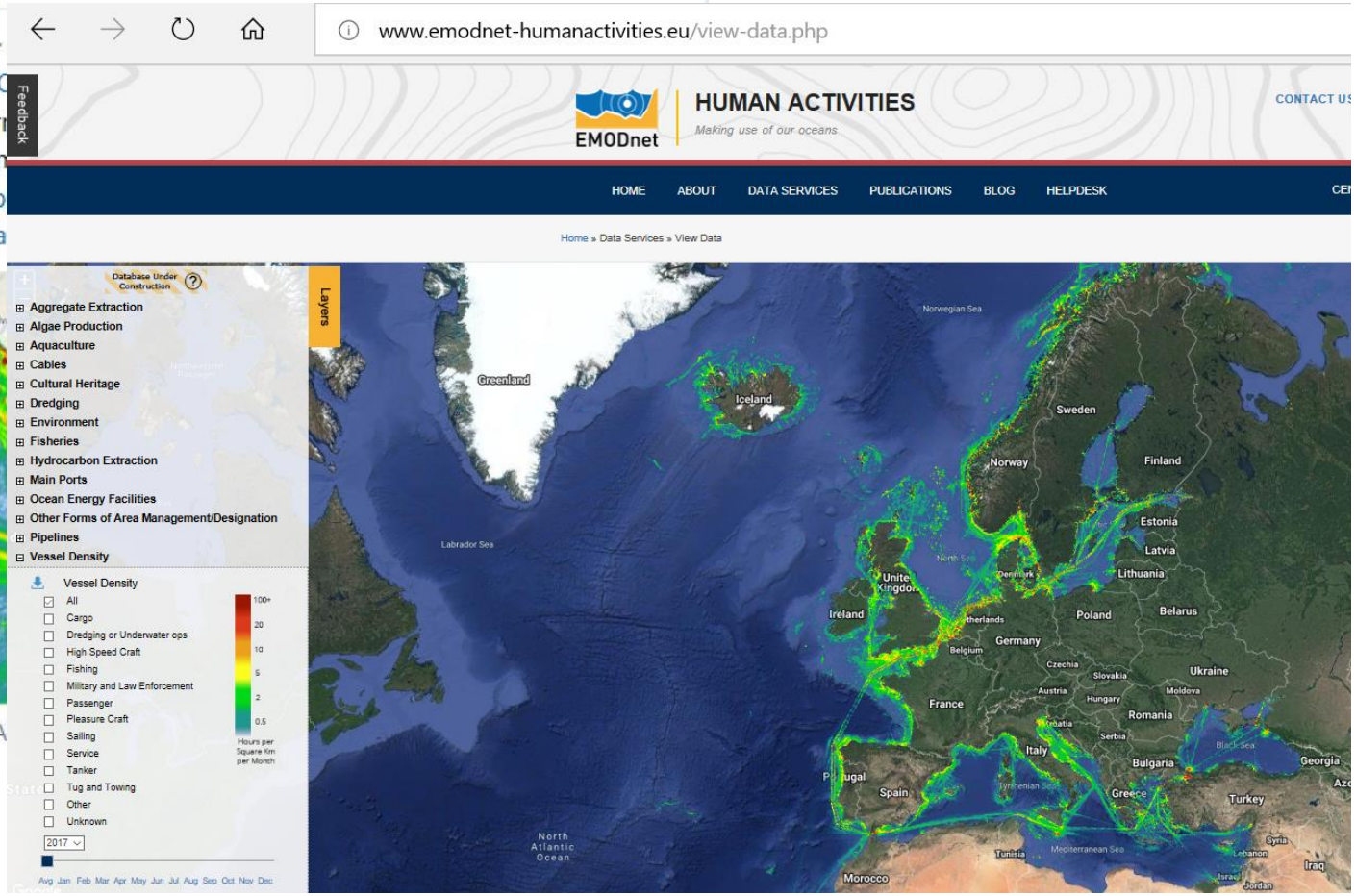
https://www.emodnet-ingestion.eu/



III. EMODnet Phase III: Human Activities

NEW data product: Vessel density maps, March 2019



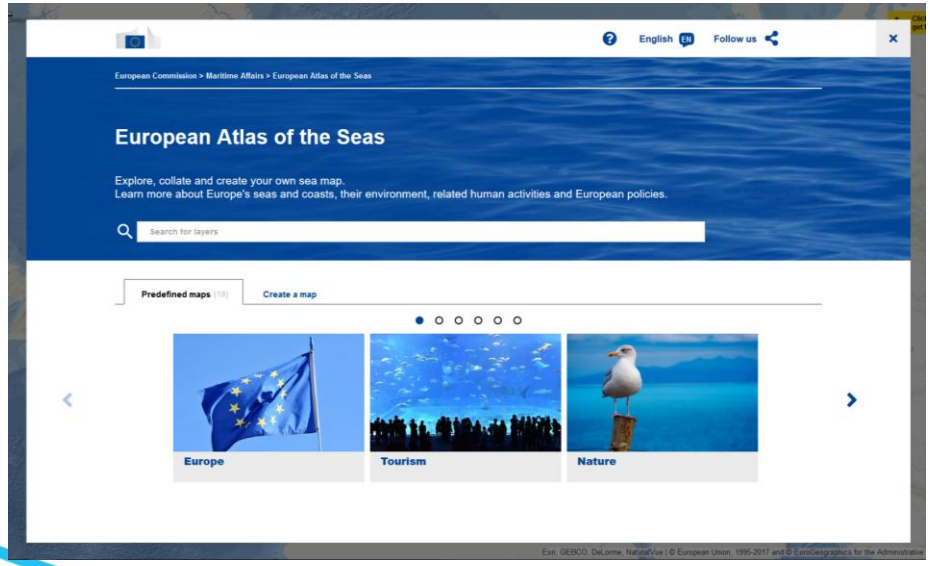


http://www.emodnet-humanactivities.eu/view-data.php

III. EMODnet Phase III

The European Atlas of the Seas (EAS): A web mapping application for a more ocean literate society

- An educational Web mapping application published by EC/DG MARE;
- Attractive, easy to digest, interactive ocean and coastal maps;
- Communication tool for citizens, educators and marine professionals



www.eu-atlas.org

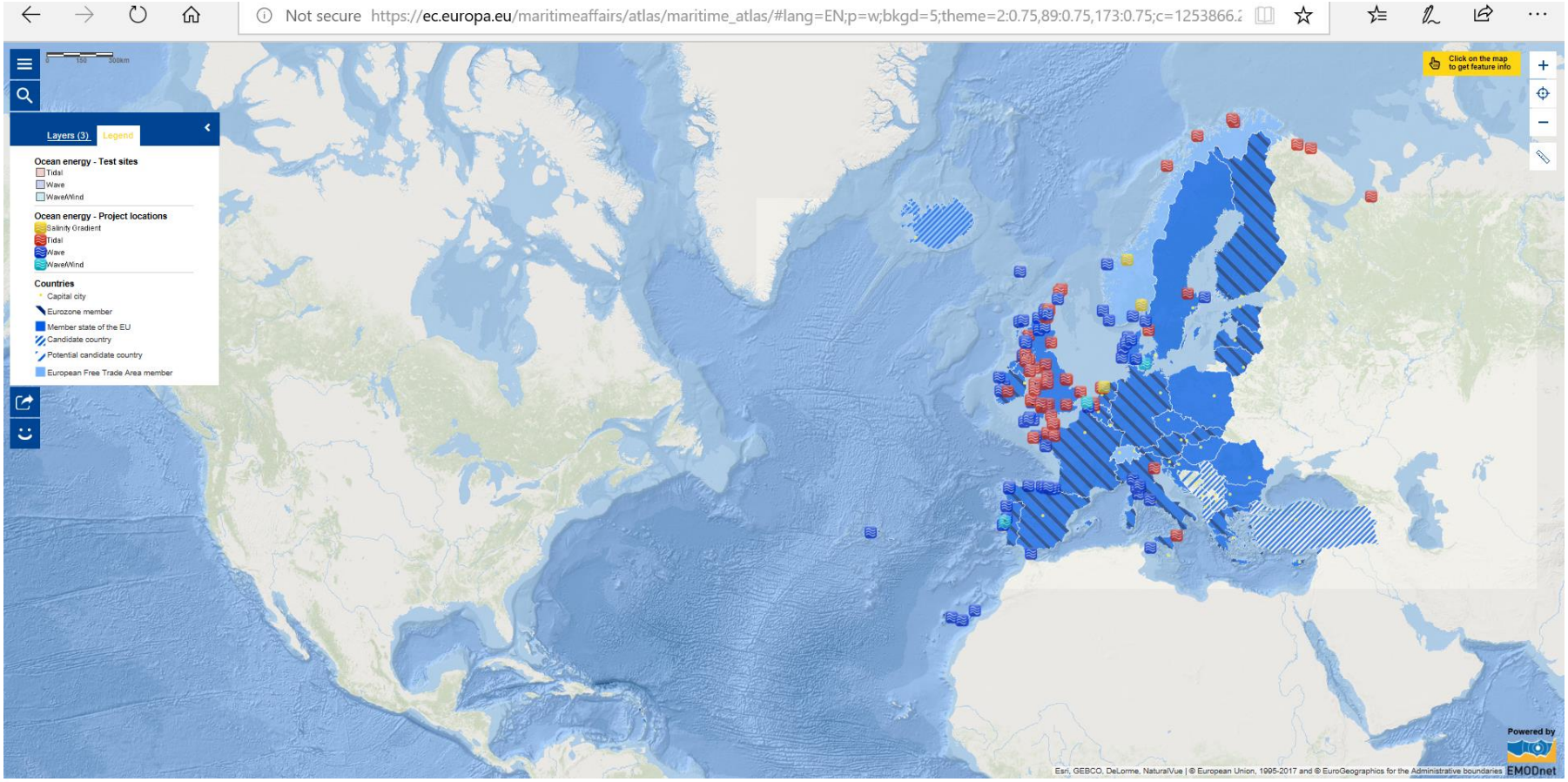
http://ec.europa.eu/maritimeaffairs/atlas/maritime_atlas/

II. EMODnet Phase III: EAS

- EMODnet Secretariat management since October 2017
- Revamped June 2018
- 250 marine map layers, by theme
- 18 thematic pre-composed maps + a create / share/ export mode e.g. transport, energy
- 2500 to 5000 visitors/month
- 24 EU official languages *NEW in January 2019!*
- Open access data layers from many service providers: 50% (>100 map layers) by EMODnet
- Regular updates: EAS catalogue automatic updates through Web services provided by the data providers

http://ec.europa.eu/maritimeaffairs/atlas/maritime_atlas/

III. EMODnet Phase III: EAS
Renewable Ocean energy

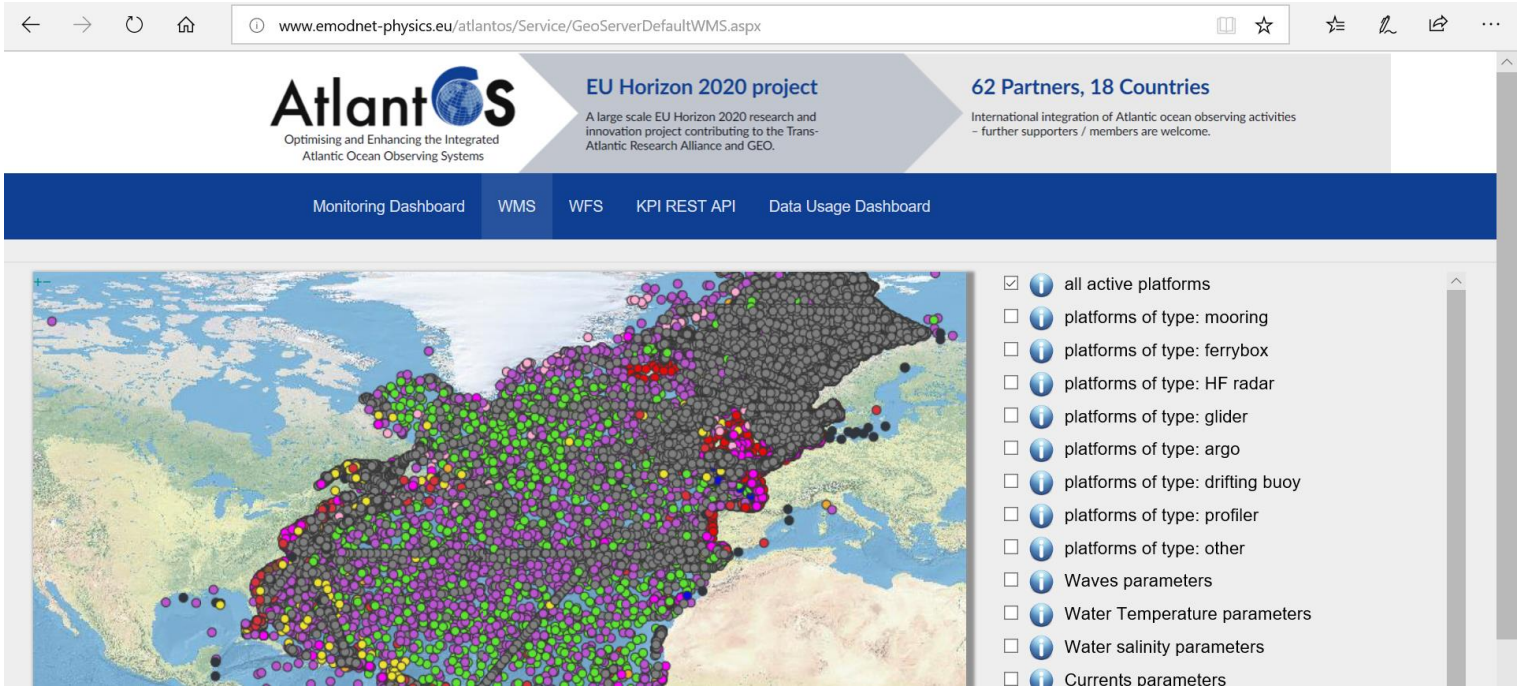


http://ec.europa.eu/maritimeaffairs/atlas/maritime_atlas/

Data provided by EMODnet Human Activities

IV. Valorisation of Atlantic data + products

EMODnet physics and the AtlantOS dashboard



-View ocean observing platforms + key performance indicators (KPIs), including data use.
-Metadata gives link back to data originator and open source access e.g. EMODnet.

Developed for H2020 AtlantOS project by EMODnet physics, EuroGOOS, Copernicus Marine Service, JCOMM OPS.

www.emodnet-physics.eu

IV. Valorisation of Atlantic data + products

For H2020 ATLAS: Central to the 4 ATLAS Objectives

- **Advance** our understanding of deep Atlantic marine ecosystems and populations
- **Improve** our capacity to monitor, model and predict shifts in deep-water ecosystems and populations
- **Transform** new data, tools and understanding into effective ocean governance
- **Scenario-test** and develop science-led, cost-effective adaptive management strategies that stimulate Blue Growth

EMODnet enables all 4 ATLAS objectives and enables:
- the access to, use of, and transformation of data and knowledge to wider stakeholders e.g. for conservation management, policy making, blue economy

IV. Valorisation of Atlantic data + products

H2020 ATLAS: Open access data and research outputs

Open access and long-term visibility to data:

- Open access to ATLAS data + data products via Pangaea + EMODnet (UniHB, BGS, Seascape Belgium; ALL)
- Scoping of data flow + methodology (UniHB; Seascape Belgium);

Online, open access ATLAS community tools and resources:

- H2020 ATLAS community page (Seascape Belgium, ALL);
- Embedded GIS platform (Seascape Belgium, BGS, UniHB)

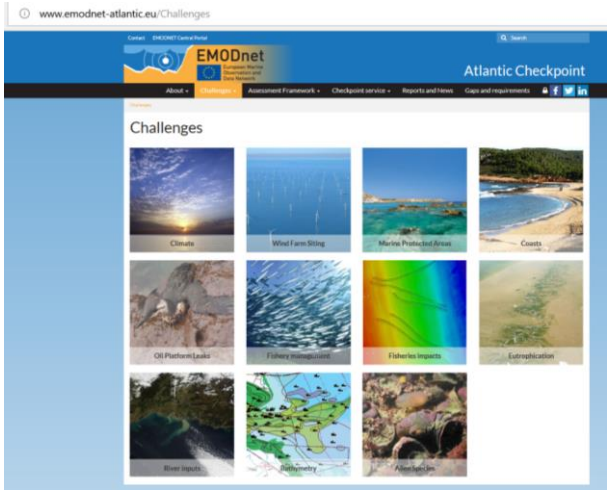
Longer-term transfer of outputs for wider stakeholders:

- European Atlas of the Seas: EU tool for society (Seascape Belgium)
- Industry: Data user (and provider): Link ATLAS with EMODnet for Business

IV. Valorisation of Atlantic data + products

EMODnet Sea-basin Checkpoints: User perspective

What? User perspective to stress-test data adequacy to address real-life situations and uses e.g. windfarm siting
Why? Get feedback from data users on needs and gaps; Develop EMODnet Checkpoint standard methodology.



What could ATLAS do? Assess case studies and propose new Challenge(s) specific to ATLAS objectives e.g. Marine Spatial Planning (MSP) needs, conservation management / wider for Atlantic Ocean;
Link to industry: ATLAS industry stakeholders; EMODnet for Business (Associated partners); EC Marine Knowledge Expert Group (MKEG).

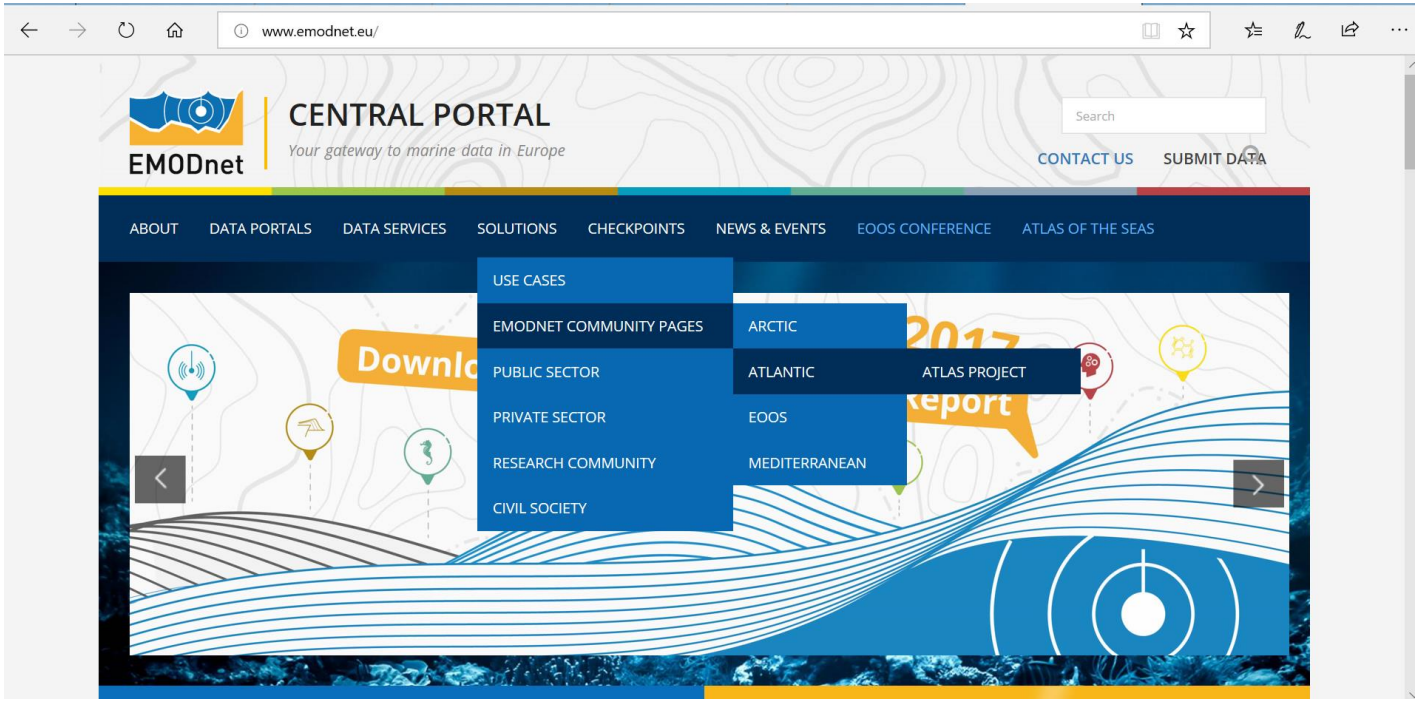
Longer-term uptake of ATLAS recommendations by EMODnet, H2020 projects etc

http://www.emodnet.eu/atlantic

https://webgate.ec.europa.eu/maritimeforum/en/node/4204

IV. Valorisation of Atlantic data + products

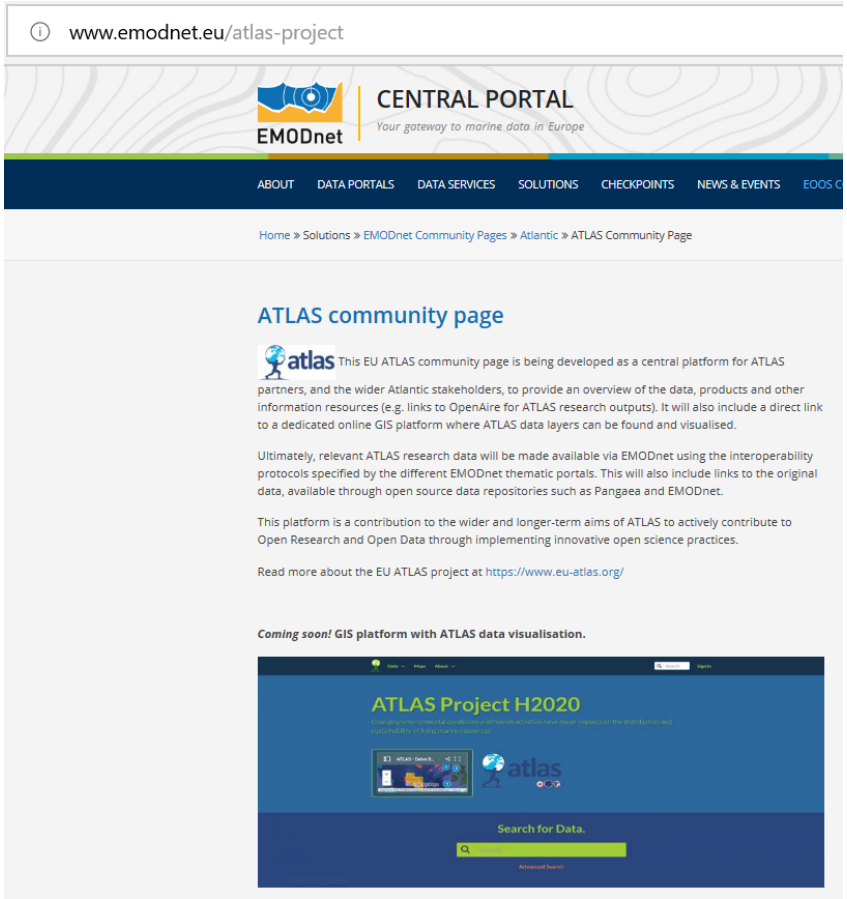
ATLAS online community page



Open access resource for EU ATLAS community and wider stakeholders to view and search ATLAS data layers, tailor make maps of interest (multiple layers/case study), view and link to other ATLAS outputs and open source service providers

IV. Valorisation of Atlantic data + products

ATLAS online community page



- **Tool for wider Atlantic stakeholders:** Open access, long-term visibility for ATLAS outputs
- **Not another data repository!** Link to source data layers and open source data services
- **Information on ATLAS outputs** (data, data products, other)
- **Embedded GIS platform** to search + visualize ATLAS data (case study regions)

http://www.emodnet.eu/atlas-project

V. H2020 ATLAS GIS platform

Pascal Derycke:

EMODnet Technical Coordinator

EAS Coordinator

EMODnet
European Marine Observation and Data Network

Your gateway to marine data in Europe

Atlas-horizon2020.eu – a geospatial data repository for ATLAS project

(Mallorca April 2019)

Pascal Derycke
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EMODnet Secretariat

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.

How to improve collaboration and data-sharing?
ATLAS H2020 feeding into EMODnet

www.atlas-h2020.eu
Geospatial Content Management System

What is GeoNode?

- A popular approach to spatial data infrastructure focused around **users**. GeoNode is an open source platform that facilitates **collaborative** use of geospatial data and maps. Geonode lets you upload, manage, browse and search data.

- GeoNode enables the creation, sharing and collaborative use of geospatial data.

- Simple web-based application
  - Web Front-end
  - Web back-end with privacy controls to restrict access as needed

Other projects using Geonode…

http://worldmap.harvard.edu/

WorldMap is being developed by the Center for Geographic Analysis at Harvard University.

http://www.haitidata.org/

HaitiData is a platform designed to disseminate, share and exploit GIS and cartographic data about Haiti.

http://geonode-rris.biopama.org/

BIOPAMA: a data repository for biodiversity and protected areas

https://www.caribbeanmarineatlas.net/

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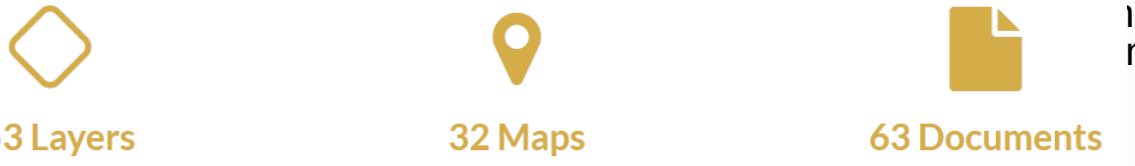

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nagement

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Data Maps About Search Sign in

ATLAS Project H2020

Changing environmental conditions and human activities have major impacts on the distribution and sustainability of living marine resources.

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atlas

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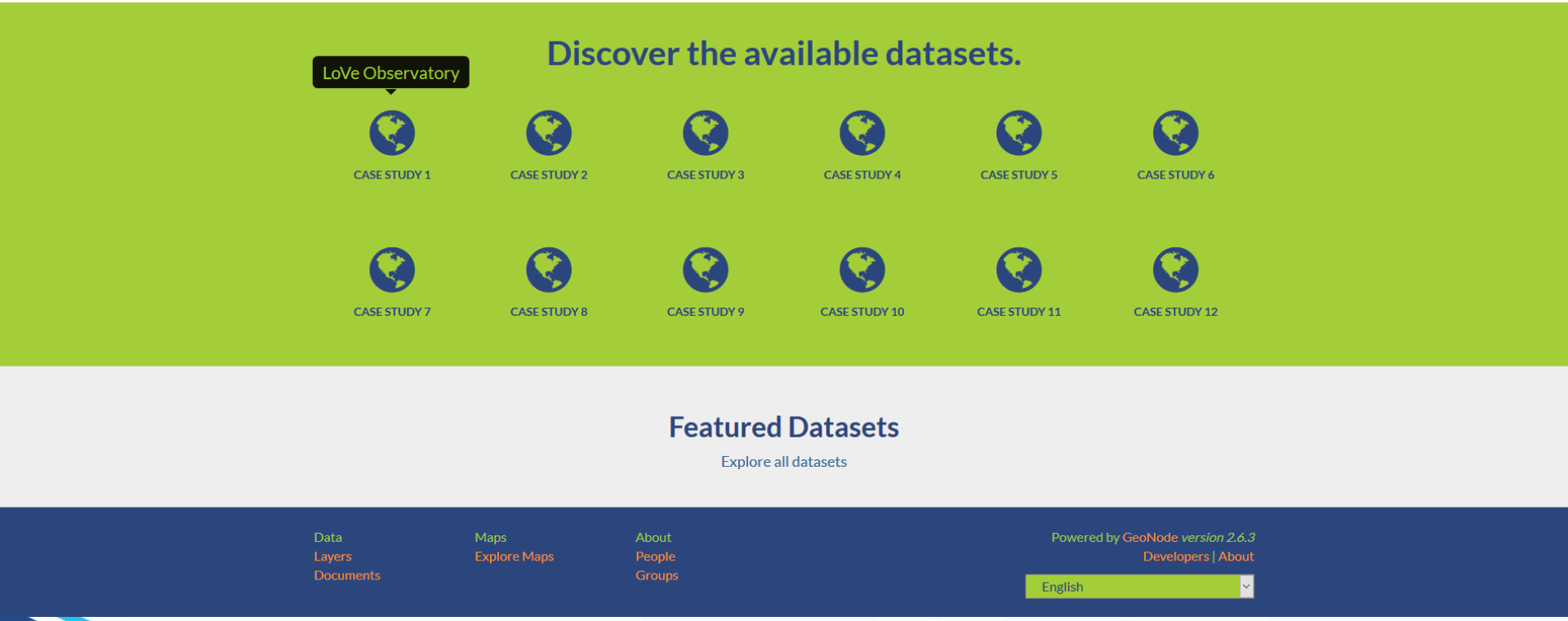

The portal goals

- Collecting geospatial data from the Atlas H2020 project in one single gateway
- Makes data useful by sharing with working groups as EMODnet
- Use existing data to create maps
- Offer data download in a variety of formats
- Search Data and Metadata

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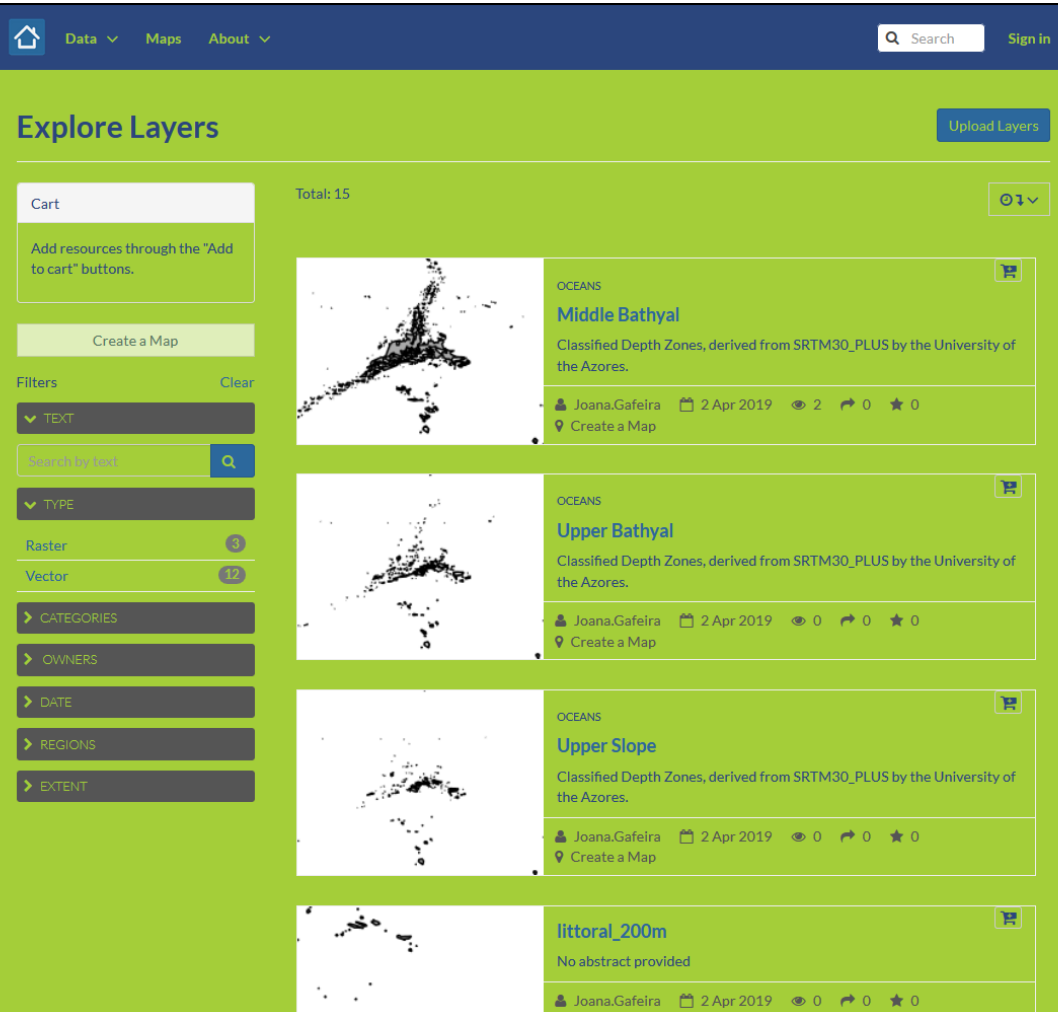
Explore layers



Data visualisation

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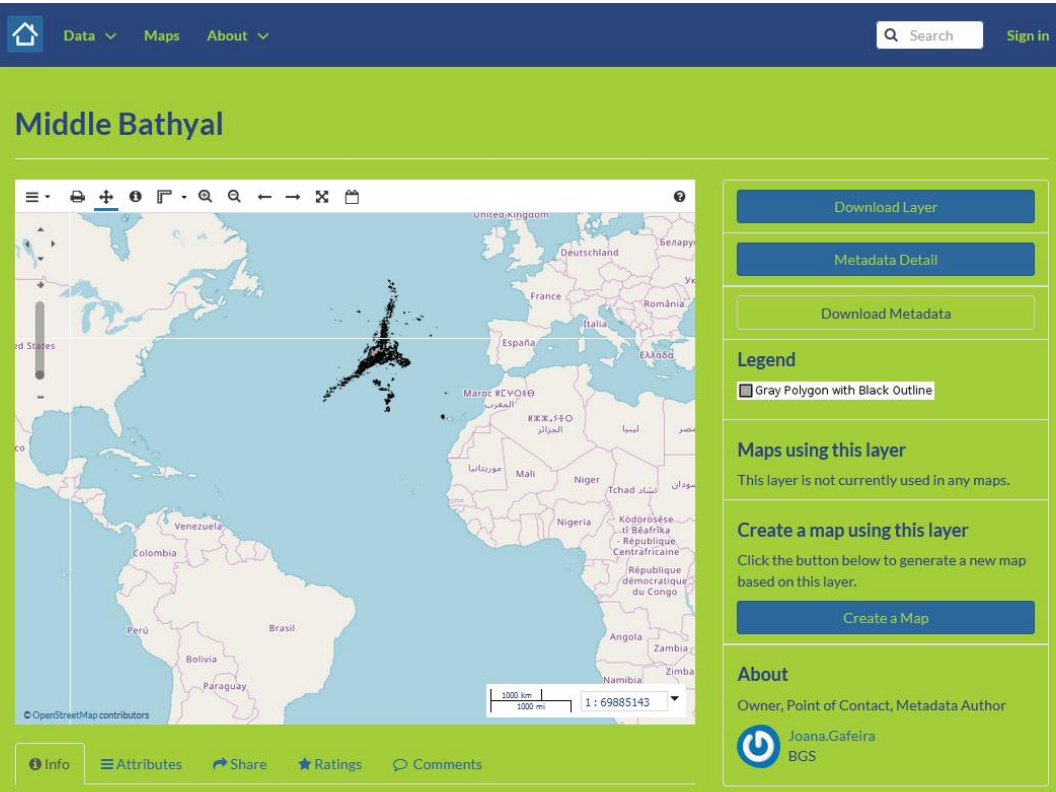
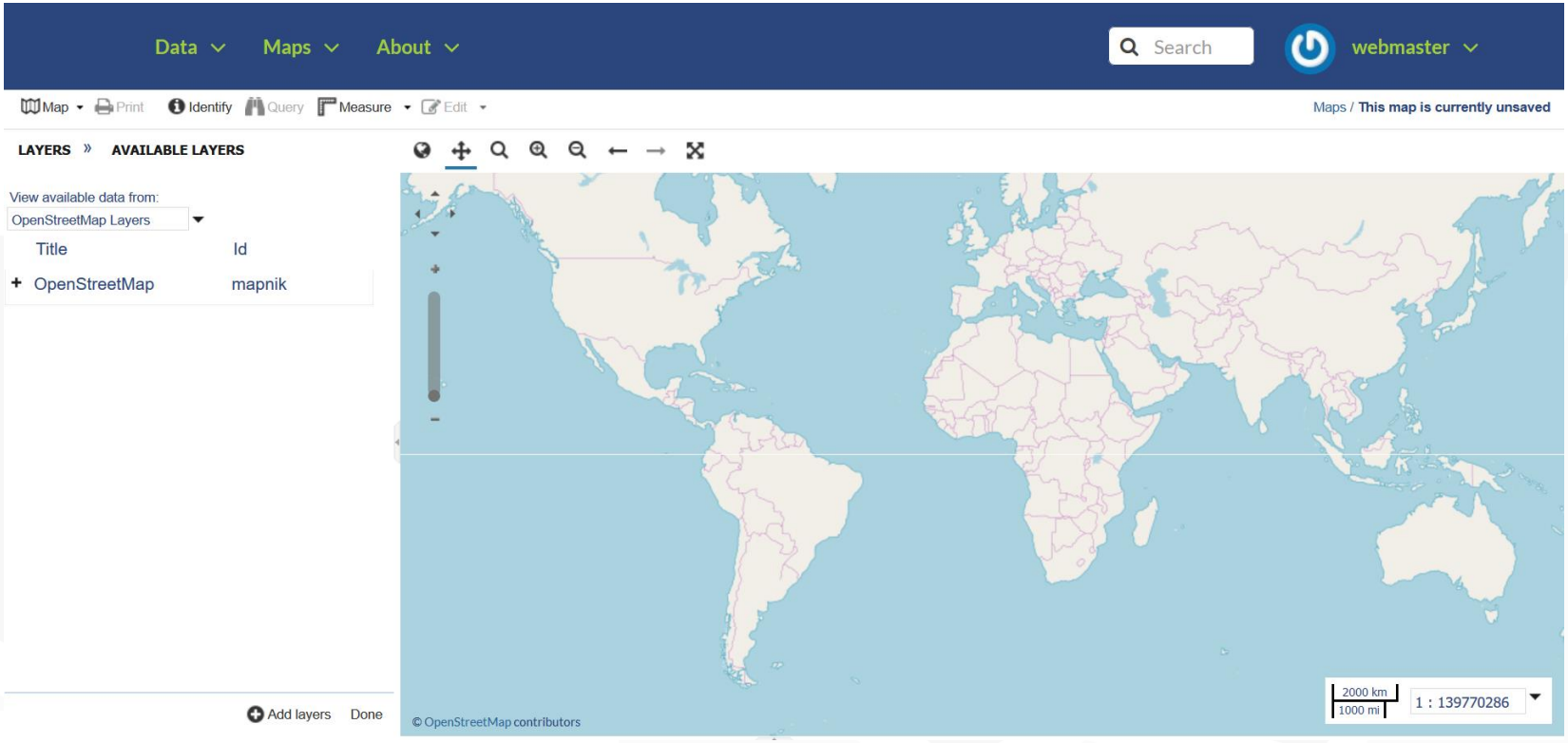


Create maps


Data
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About
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Map
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Measure
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Title
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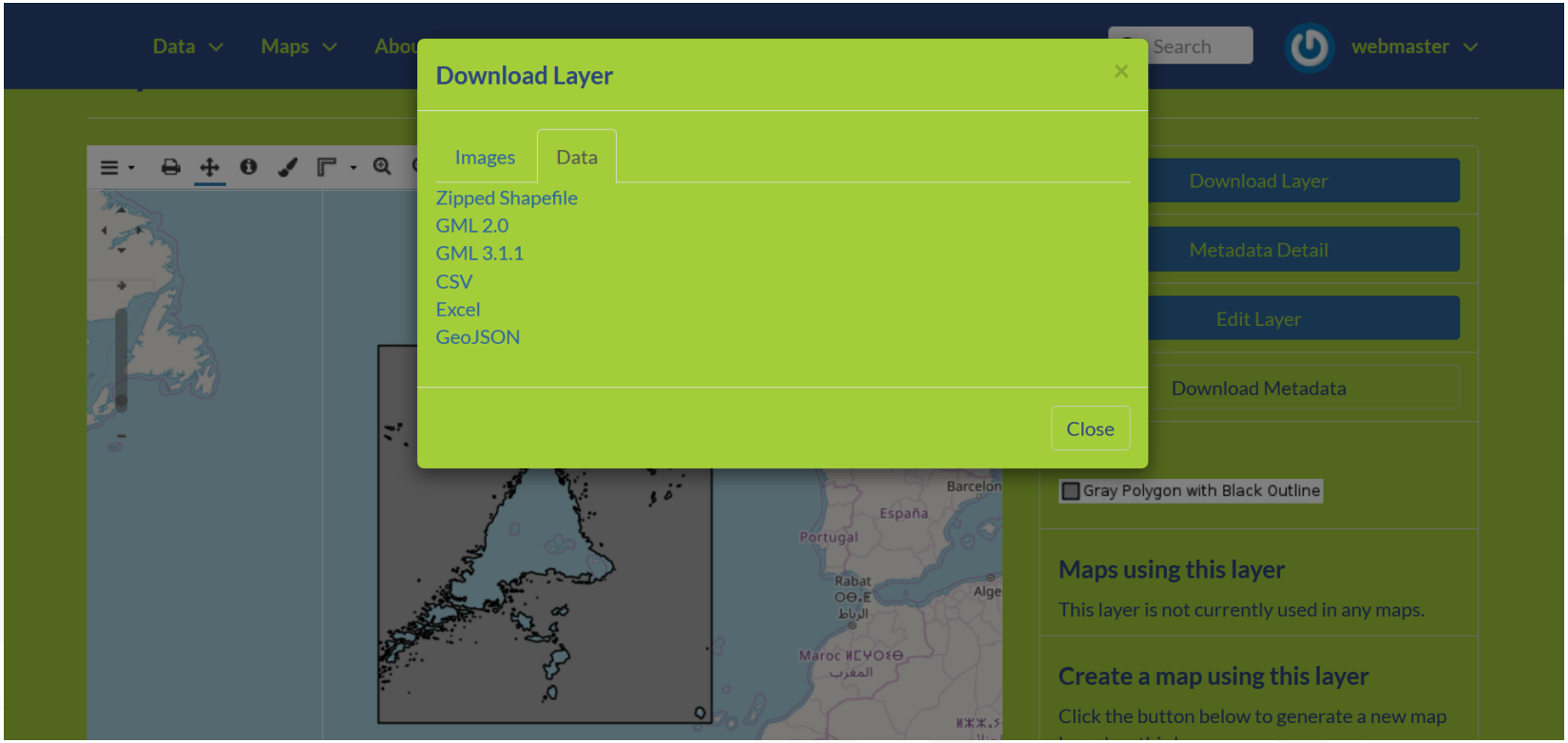
Offer data download in a variety of formats



www.atlas-h2020.eu Services

- Easily upload geospatial data
- Manage and publish Metadata
- Access control
- Interoperable OGC services WMS, WFS, WCS,… and metadata catalogue service (CSW endpoint)

- Social features

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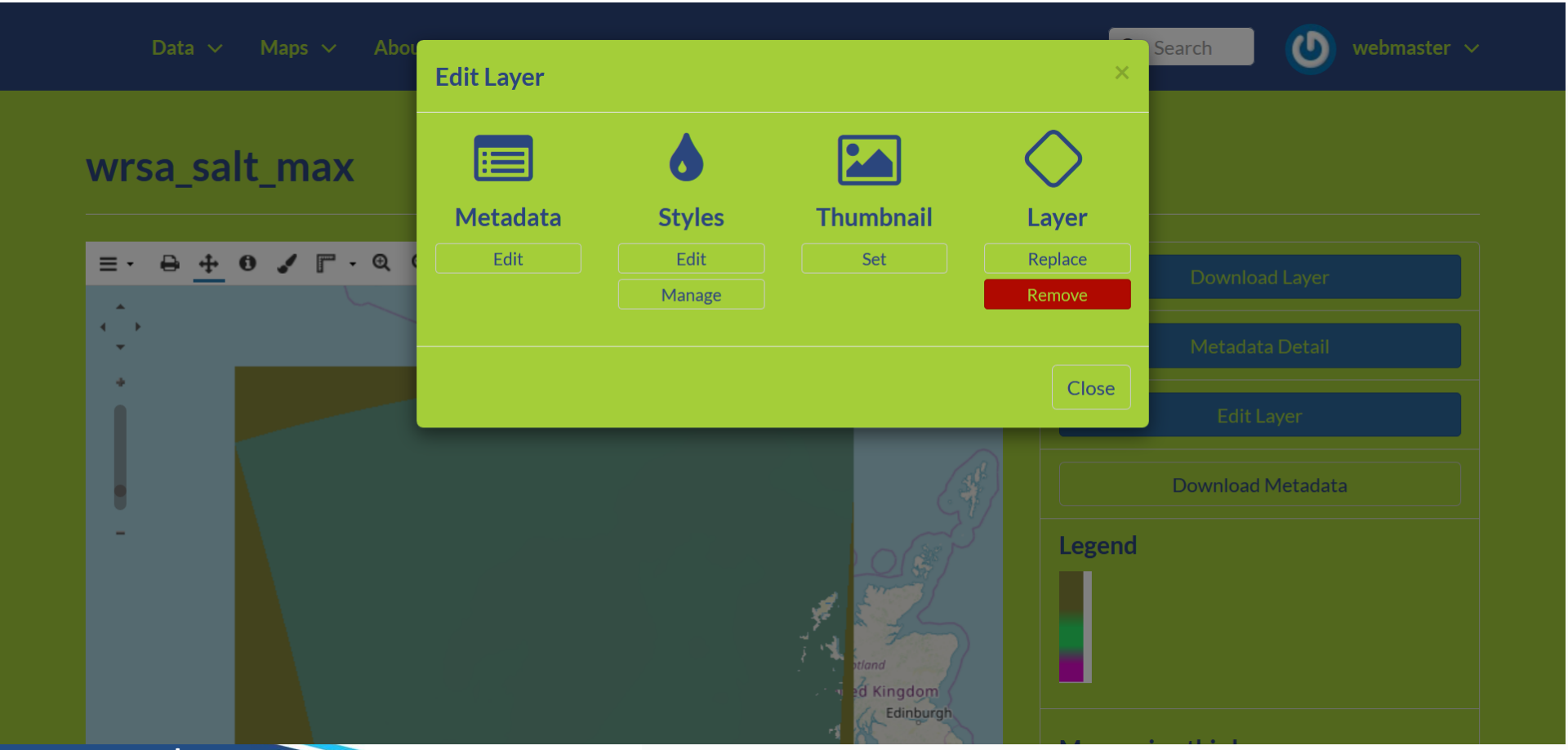
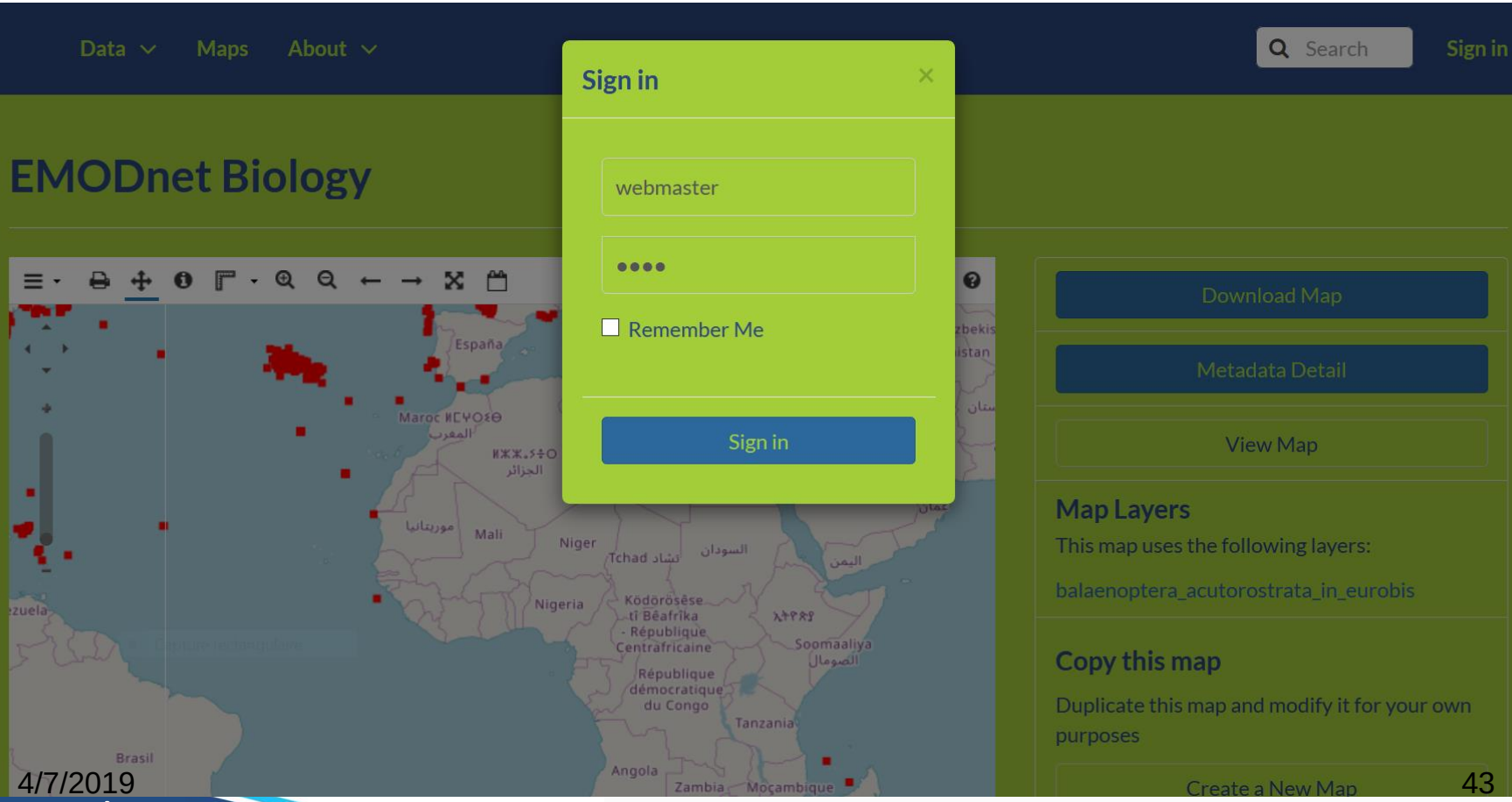
Manage metadata



Access control



OGC services WMS, WFS, WCS,… and metadata catalogue service

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Data Maps About Search webmaster

Information for Developers

Useful information for developers interested in GeoNode.

GeoNode is an open service built on open source software. We encourage you to build new applications using the components and resources it provides. This page is a starting point for developers interesting in taking full advantage of GeoNode. It also includes links to the project's source code so anyone can build and customize their own GeoNode.

GeoNode Software

All the code that runs GeoNode is open source. The code is available at http://github.com/GeoNode/geonode/. The issue tracker for the project is at http://github.com/GeoNode/geonode/issues.

GeoNode is built using several open source projects, each with its own community. If you are interested in contributing new features to the GeoNode, we encourage you to do so by contributing to one of the projects on which it is built:

- GeoExt - The JavaScript toolkit for rich web mapping applications
- GeoServer - Standards based server for geospatial information
- GeoWebCache - Cache engine for WMS Tiles
- OpenLayers - Pure JavaScript library powering the maps of GeoExt

GeoNode's Web Services

GeoNode's Web Services are available from the following URLs:

Dynamic tiles via WMS:	WMS 1.1.1
Vector data via WFS:	WFS 1.1.0
Raster data via WCS:	WCS 1.1.1
Metadata search via CSW:	CSW 2.0.2
Metadata search via OpenSearch:	OpenSearch 1.0
Metadata search via OAI-PMH:	OAI-PMH 2.0
Open Data:	data.json
Cached tiles via WMTS:	WMTS 1.0.0

Social features

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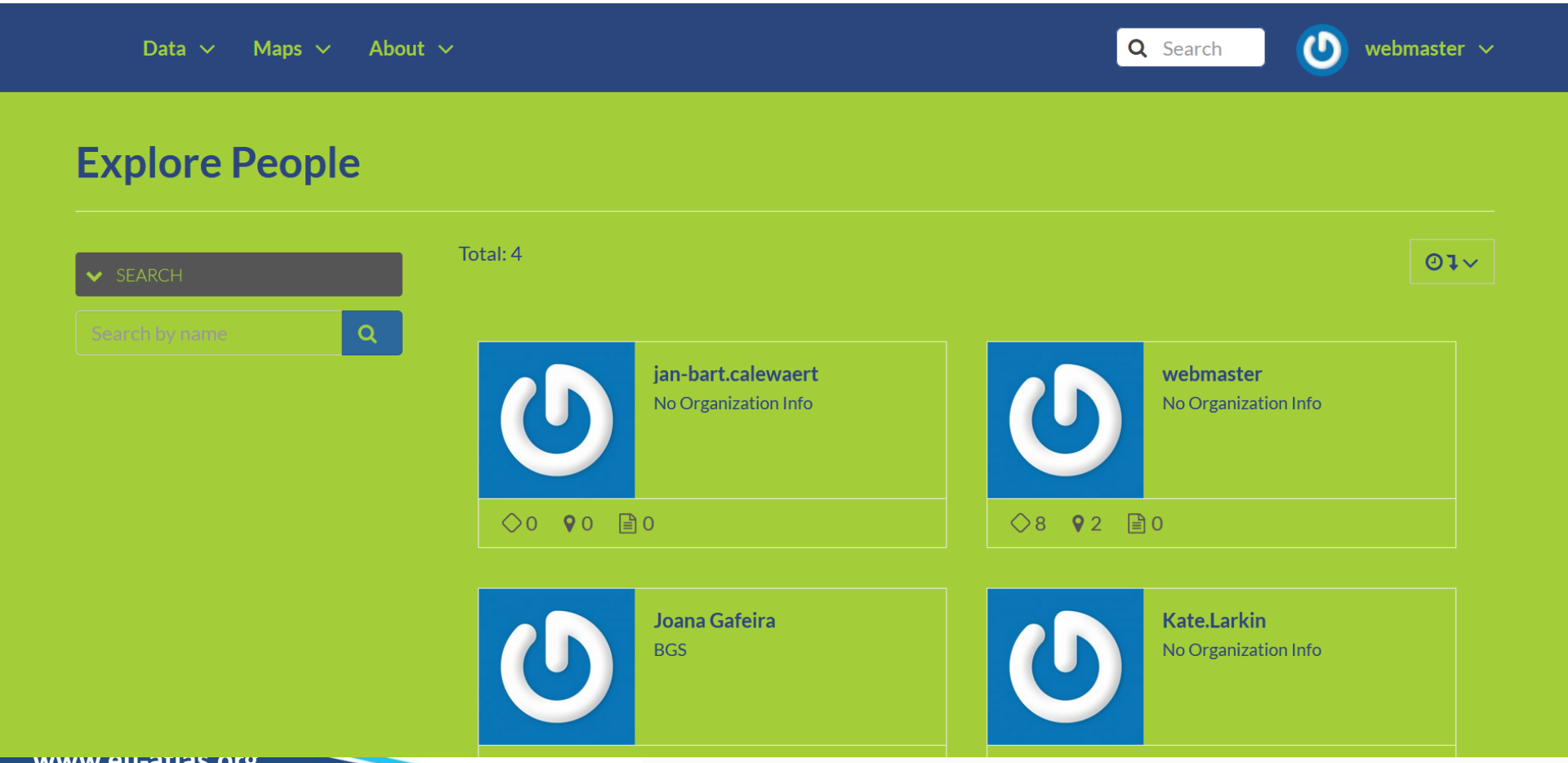

Geonode stack: all open source

- CMS (Django, Python)
- GIS Server (GeoServer – OGC standards)
- DB (PostGIS)
- OGC Catalogue service (Pycsw or GeoNetwork)
- Mapping client (OpenLayers)

Geospatial data requirements

- ESRI Shapefile format, KML
- Geotiffs
- Projection information (recommended GCS WGS84)
- Metadata (ISO TC211)

VI. Next steps

- **GIS platform: Spatial visualization of ATLAS data:** Populate GIS platform (Geonode) with ATLAS data and data products. Focus: ATLAS case study areas (SSBE, BGS, UniHB, ALL ongoing) (Ongoing, full data by Autumn 2019)
- **ATLAS community page on EMODnet:**
  -Embed GIS platform (SSBE, BGS, UniHB, ongoing);
  -Further develop content of ATLAS community page: ATLAS outputs, open access services? (SSBE, ALL; April 2019 -)
- **Industry interaction and feedback (WP6)**
- **Data ingestion into EMODnet** (UniHB, SSBE, ALL; ongoing)
- **Longer-term continuation and development:**
  -ATLAS map layers into EAS?
  -Recommendations for future Checkpoint Challenge(s)
  - Input to i-Atlantic and link to TRI-ATLAS (BG-8 H2020)

Thank You

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Template developed by AquaTT

EMODnet European Marine Observation and Data Network

Your gateway to marine data in Europe

The European Marine Observation and Data Network (EMODnet) is financed by the European Union under Regulation No 508/2014 of the European Parliament and of the Council of 15 May 2014 on the European Maritime and Fisheries Fund.

Image © M Bilan

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