The European Marine Observation and Data Network

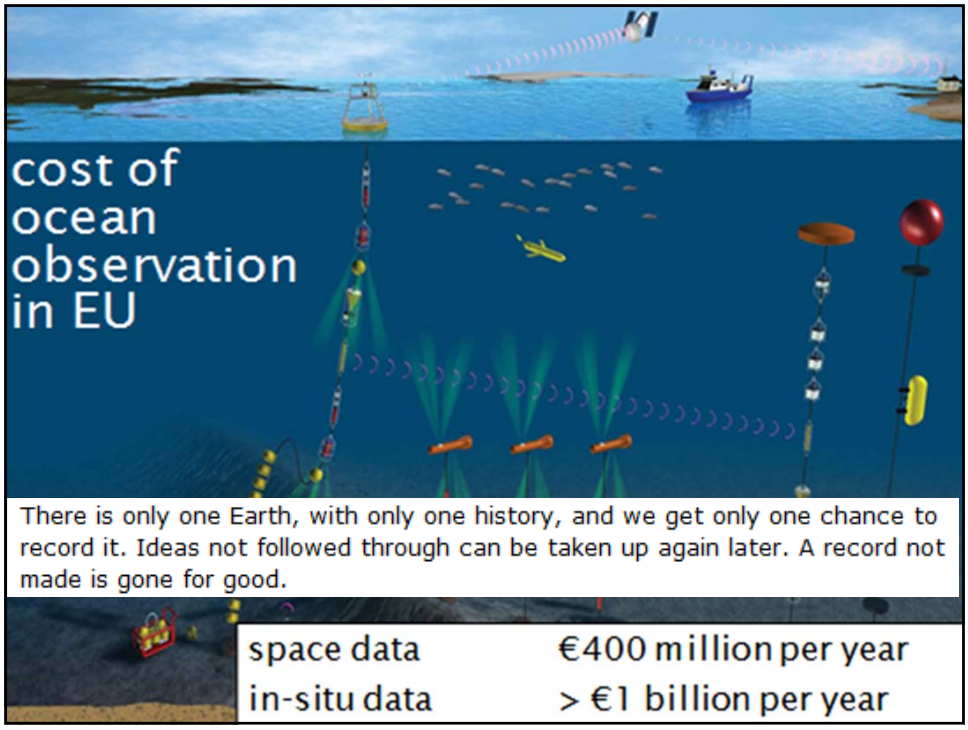
EMODnet Open Conference

De Grote Post, Oostende, Belgium

Tuesday 20 October 2015

info@emodnet.eu

EMODnet



EMODnet
European Marine Observation and Data Network

High level aims

- Change the present fragmented EU repositories of marine data with an interoperable sharing framework
- Move to a new paradigm where data are collected once and used for many purposes
- Optimize observation networks by showing how monitoring meets the needs of public and private users (CHECKPOINT)

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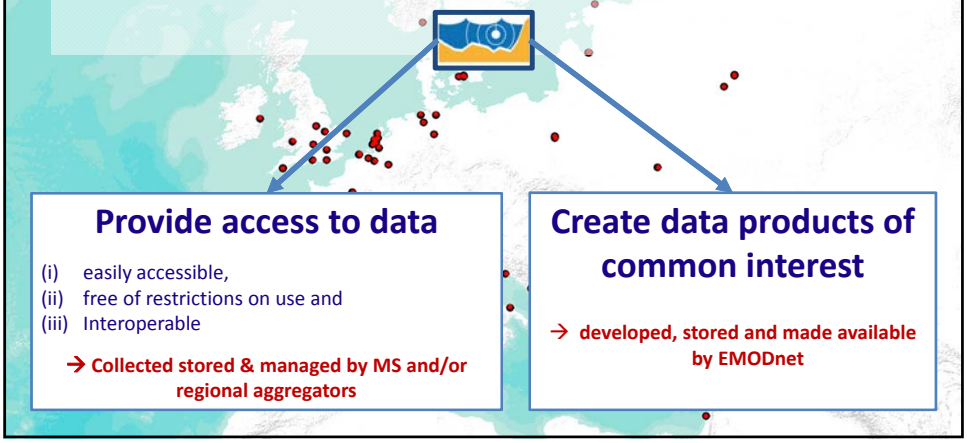
Vision Target for 2020

- **Seamless multi-resolution digital seabed map of European waters by 2020**
  - Highest resolution possible in areas that have been surveyed;
  - Topography, geology, habitats and ecosystems;
- **Accompanied by timely information on**
  - Physical, chemical and biological state of the overlying water column
  - Oceanographic forecasts;
- **Easily accessible, interoperable and free of restrictions on use;**

EMODnet
European Marine Observation and Data Network

What?

A network of people and technology that work together to compile and distribute data, metadata and products on European coastal and ocean waters"



Provide access to data

(i) easily accessible,
(ii) free of restrictions on use and
(iii) Interoperable

→ **Collected stored & managed by MS and/or regional aggregators**

Create data products of common interest

→ **developed, stored and made available by EMODnet**

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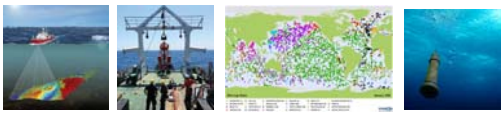
European Marine Observation and Data Network

Why?

Benefits for users

- Reduced costs for offshore activities
  - no need to repeat measurement that made by others
  - costs less to assemble data from different sources
- Stimulation of innovation and competition
- Reduced uncertainty in knowledge



Benefits for providers

- Increase number/kinds of users - help justify investments
- Contribute to data products - increase visibility
- Make better use of own data via access to others' data
- May help data providers comply with their obligations

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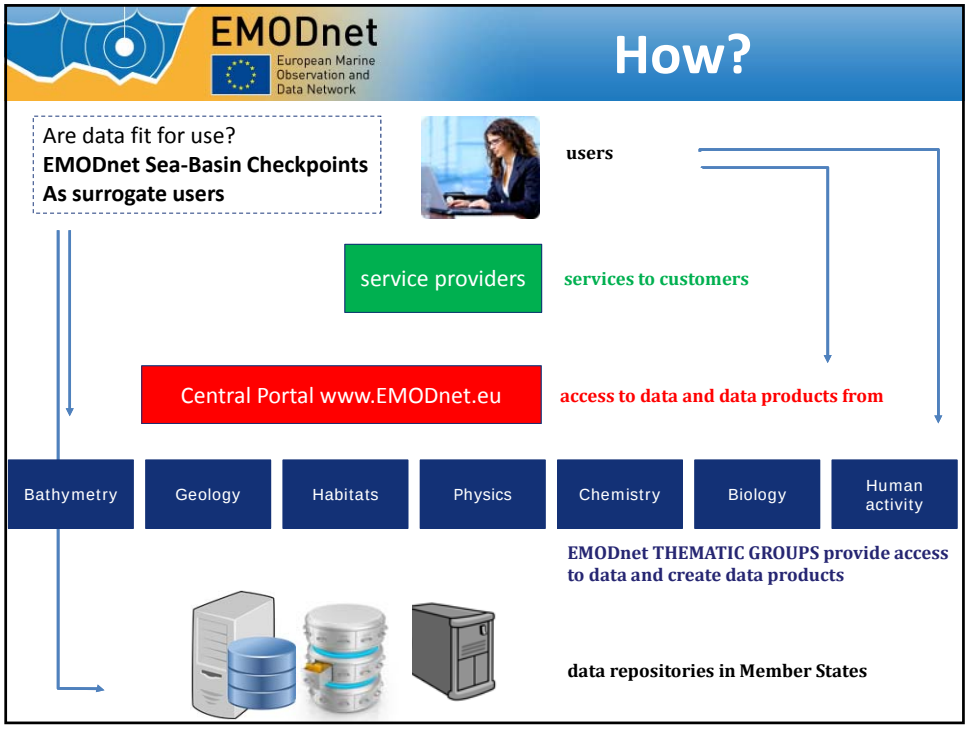
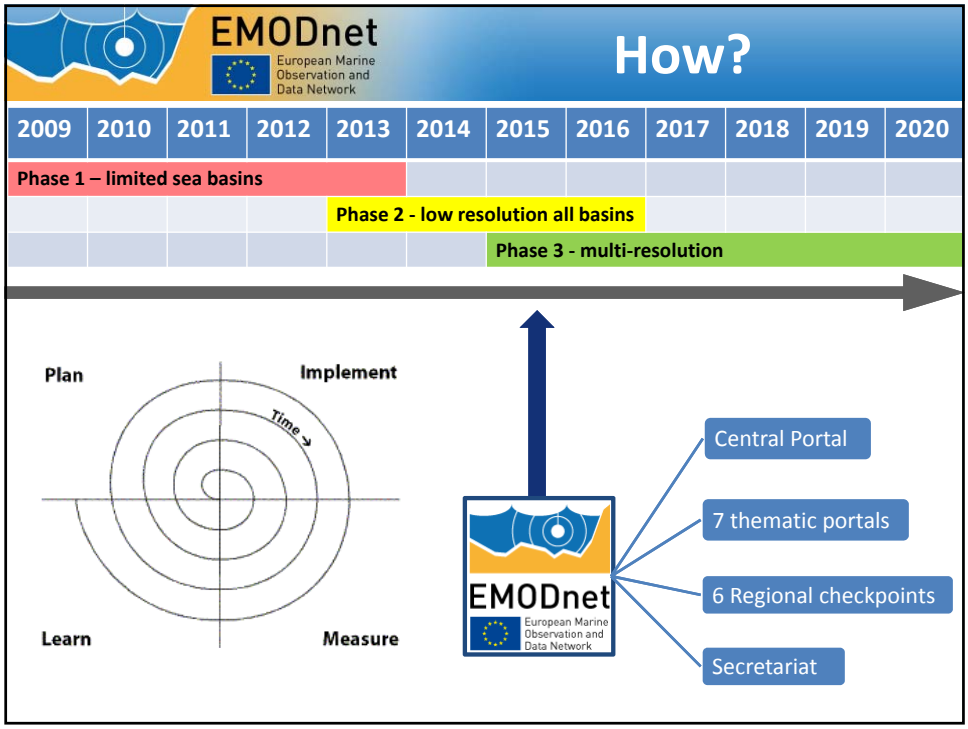
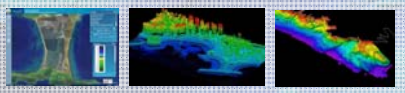

EMODnet
European Marine Observation and Data Network
How?
Are data fit for use?
EMODnet Sea-Basin Checkpoints
As surrogate users
users
service providers
services to customers
Central Portal www.EMODnet.eu
access to data and data products from
Bathymetry
Geology
Habitats
Physics
Chemistry
Biology
Human activity
EMODnet THEMATIC GROUPS provide access to data and create data products
data repositories in Member States


EMODnet
European Marine Observation and Data Network
How?
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Phase 1 – limited sea basins
Phase 2 - low resolution all basins
Phase 3 - multi-resolution
Plan
Implement
Time
Learn
Measure
EMODnet
European Marine Observation and Data Network
Central Portal
7 thematic portals
6 Regional checkpoints
Secretariat

EMODnet Coastal Mapping

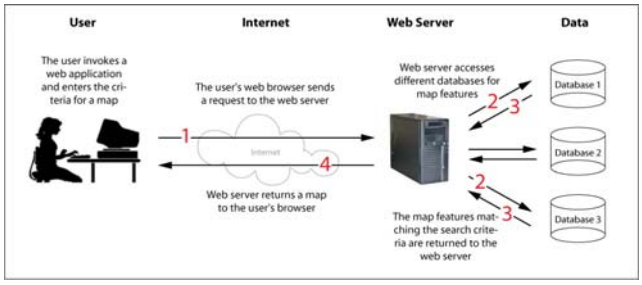
Objectives

- **Assess** current **availability of digital coastal maps** in EU
- **Disseminate** information by EMODnet
- **Share experience** of coastal mapping in EU
- **Develop standards** for best practices
- Propose how future **Joint European Coastal Mapping Programme** could operate



SHOM
gael.morvan@shom.fr

The Central Portal



VLIZ

- Acts as a gateway to the other thematic and regional EMODnet portals
- Also develops own data services/products combining data from at least 2 thematic data portals

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EMODnet Secretariat?

Hosted by the Flemish Government at InnovOcean

Administered by Seascape Consultants UK

- Jan-Bart Calewaert (overall coordination) - BE
- Belén Martín-Miguez & Oonagh McMeel (Project Officers) - BE


- Vikki Gunn (communication support) - UK
- Phil Weaver (Chair of SC) – UK


- Organise EMODnet Steering Committee
- Improve visibility & disseminate EMODnet results
- Collect feedback from EMODnet users
- Test functionality of Portals and monitor overall progress
- Support the Marine Observation and Data Expert Group (MODEG)

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What next?

- **more data delivery through machine-to machine connections**
- **better access to fisheries data**
  - proposal for revised Data Collection Framework in preparation
- **better stewardship of data at end of projects**
  - research, impact assessment for offshore facilities etc
  - data ingestion tender under evaluation
- **more structured input from users**
  - user group to be set up
- **coordination with regional sea conventions**

EMODnet

1. EMODnet Bathymetry

- Overview and access to bathymetric survey data
- Free access to a medium resolution Digital Terrain Model (DTM) for all European seas
- Data (single beam, multibeam, plummets, LIDAR, ..) from national hydrographic services, marine research institutes and industry
- SeaDataNet Discovery and Access service for survey data sets
- Bathymetry Viewer and Download service

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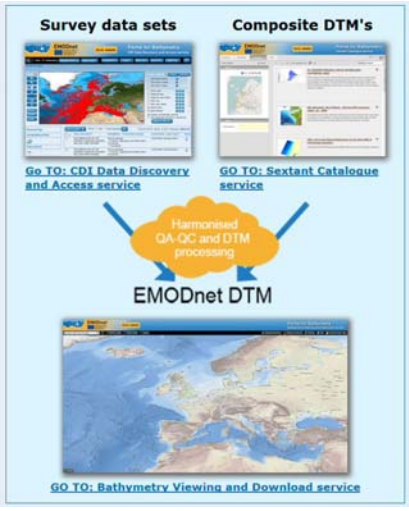
1. EMODnet Bathymetry

- > 13.800 surveys indexed
- DTM for all European seas at 1/8*1/8 arc minutes (~230 m)
- DTM uses > 7.000 survey data sets and composite DTMs from 31 data providers from 18 countries and GEBCO_2015
- DTM contains 1.092.115.678 data points (28.799 rows x 37.922 columns)
- 3 high resolution coastal areas
- Latest release: 8 Sept 2015



EMODnet

1. EMODnet Bathymetry

- DTM freely downloadable in 16 tiles in range of formats
- Direct links between DTM cells and used data sets
- Various functions for DTM browsing, retrieving information and WMS services
- full European DEM coverage on both land and water
- Free 3D-viewer

Source reference layer

Retrieving metadata of a survey

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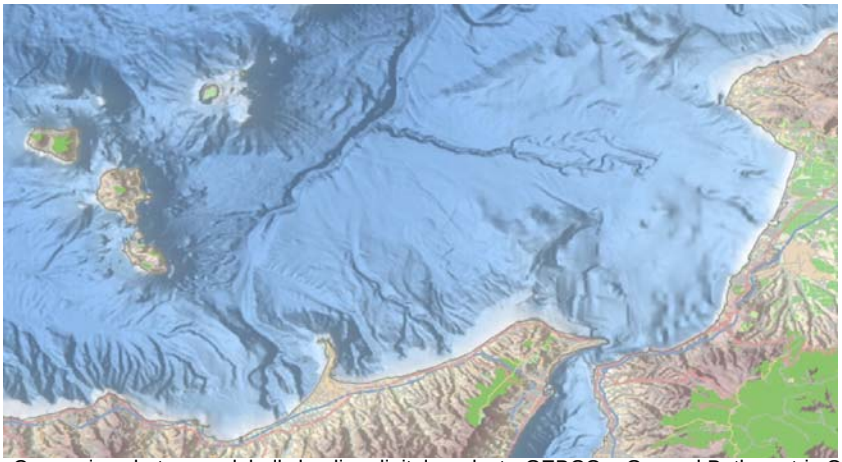
1. EMODnet Bathymetry



Comparison between globally leading digital product - GEBCO – General Bathymetric Chart of the Oceans (IHO – IOC) and EMODnet Bathymetry DTM – example in Tyrrhenian Sea near Sicily – Italy and South Italy – resolution EMODnet is 16 times higher

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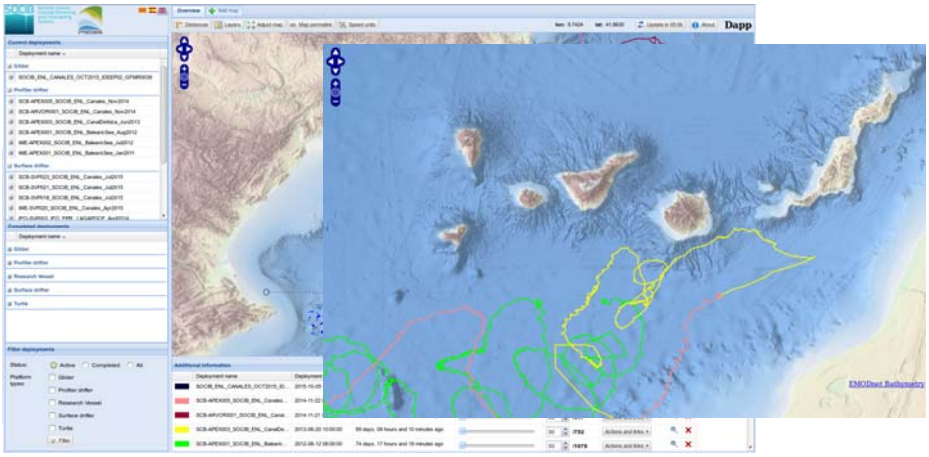
1. EMODnet Bathymetry



Example of usage: SOCIB (Baleares – Spain) use WMS as baselayer for display where marine observation instruments are deployed

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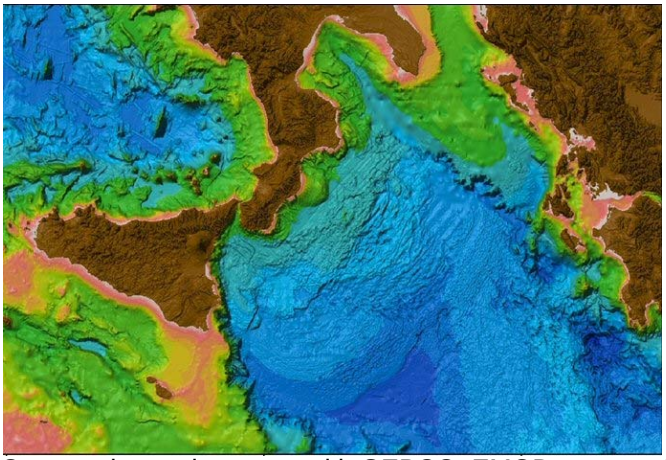
1. EMODnet Bathymetry



Cooperation and synergy with GEBCO: EMODnet uses GEBCO to cover gaps. **GEBCO uses EMODnet to improve its DTM**

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1. EMODnet Bathymetry

- Challenges now and near future:
  - increasing survey coverage with extra input from science, authorities and industry
  - improving quality of DTM
  - expanding partnership and increasing resolution
  - going to the ‘cloud’ because of ‘big data’

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1. EMODnet Bathymetry

http://www.emodnet-bathymetry.eu

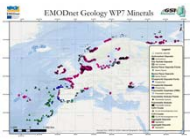
EMODnet

2. EMODnet Geology

- Portal provides access to information primarily held by national geological surveys of 30 European countries:
  - harmonised **sea-bed substrate** and bedrock geology at 1:250,000 scale where available; 1:1 million scale in other areas
  - Information on **coastal behaviour** (migration; erosion; accretion; resilience/vulnerability);
  - Locations of **earthquake activity, volcanoes, submarine landslides**. Links to updated sources of information using WMS;
  - **Mineral localities**; oil and gasfields; aggregate resources.

Seabed substrate

Coastal behaviour



Minerals

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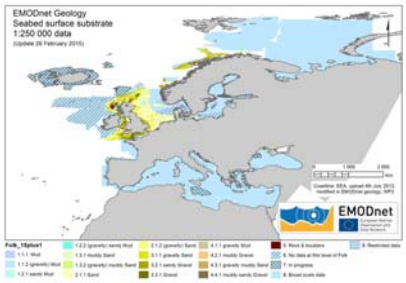
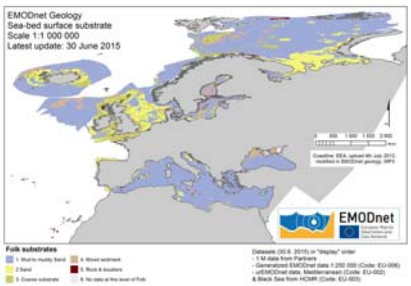
2. EMODnet Geology

Constructing geological maps at various scales



Detailed where possible (1:250,000)



Broadscale in other areas (1:1 million)

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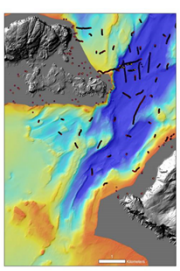
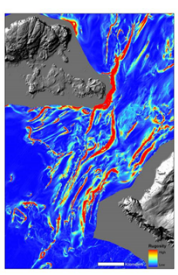
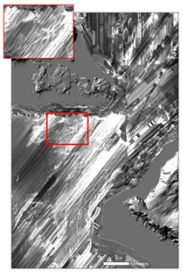
2. EMODnet Geology



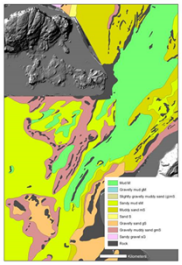
Multibeam echosounder (water depth)



Rugosity



Backscatter (acoustic response/texture



Seabed substrate/bedrock geology

Bathymetry → Geology → Seabed habitats

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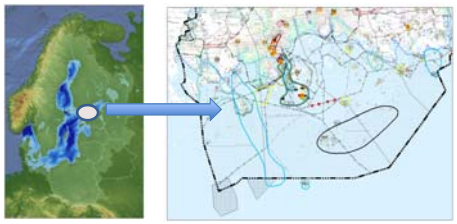
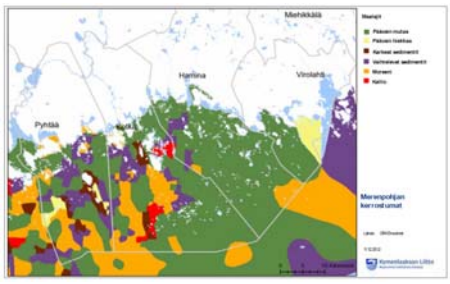
2. EMODnet Geology

- Gulf of Finland Regional Plan for Trade and the Sea Area
- **EMODnet-Geology** seabed substrate data provided to planners.
- Marine geologists (and biologists) interacted with planners to evaluate what is available for marine spatial planning.
- Information can be understood by decision-makers





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2. EMODnet Geology

- Advantages
  - Central access to **geological information from 30 countries**;
  - Building on **open-source plaform** providing access to national geological survey information and to provide best available data and access to national data catalogues.
- Challenges
  - Accessing third party data held by industry, research community etc.
  - Building on most detailed information available at national level

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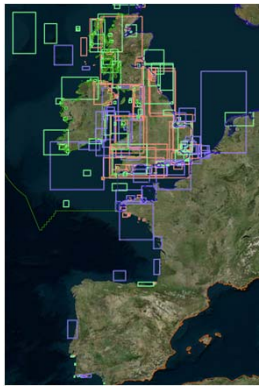
3. EMODnet Seabed Habitats

Provides you with:

- Access to habitat maps and habitat samples from surveys expressed in EUNIS (the EU nature information system)
- Access to a pan-European broad-scale EUNIS habitat map – EUSeaMap
- Access to map confidence
- Viewing and download services



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3. EMODnet Seabed Habitats

EUSeaMap Requires

Input data from:

- EMODnet Geology (from WP3: Substrate)
- EMODnet Bathymetry
- Light energy at seabed (from Meris satellite imagery)
- Currents and wave climatologies from models (MyOcean etc.)
- Temperature, salinity, O_2 from various sources
- Habitat samples data from various sources

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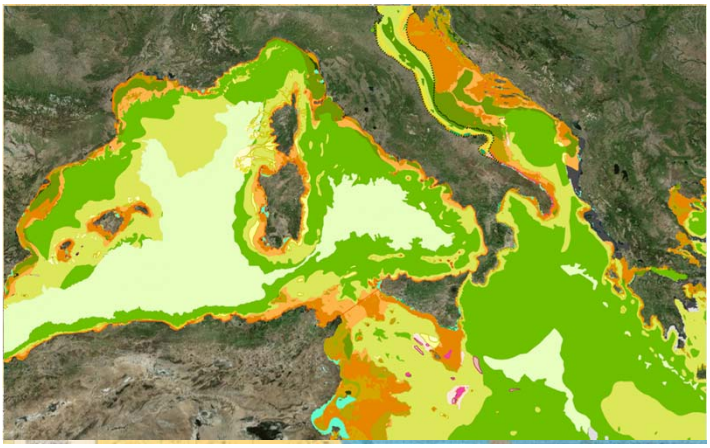
3. EMODnet Seabed Habitats

Fills a big knowledge gap



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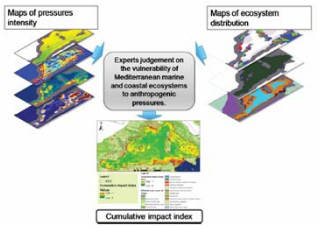
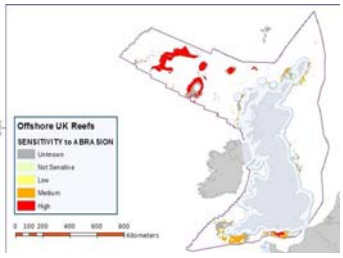
3. EMODnet Seabed Habitats

Enables a good many uses

- 1725 products downloads last year, 11% by commercial users
- Joint land use - seabed habitats map for cumulative impact index (FP7 Pegaso)



- Sensitivity maps for assessing Seabed Integrity



- Marine Directive predominant habitats mapping

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3. EMODnet Seabed Habitats

Recommends

Take-home messages

- EUNIS for all! The classification needs to be comprehensive for all basins
- Need for more biological data – A benthos survey?
- Need for higher resolution oceanographic data
- More harmonised confidence assessments
- Improving the map: trade-off between resolution and coverage

- For those posessing habitat maps, please let us have them!

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3. EMODnet Seabed Habitats

http://www.emodnet-seabedhabitats.eu

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4. EMODnet Chemistry

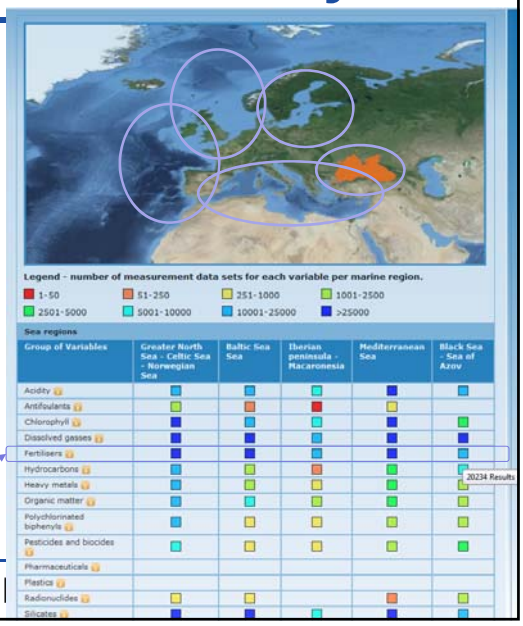
Involves **46 institutes**

Covers all European waters

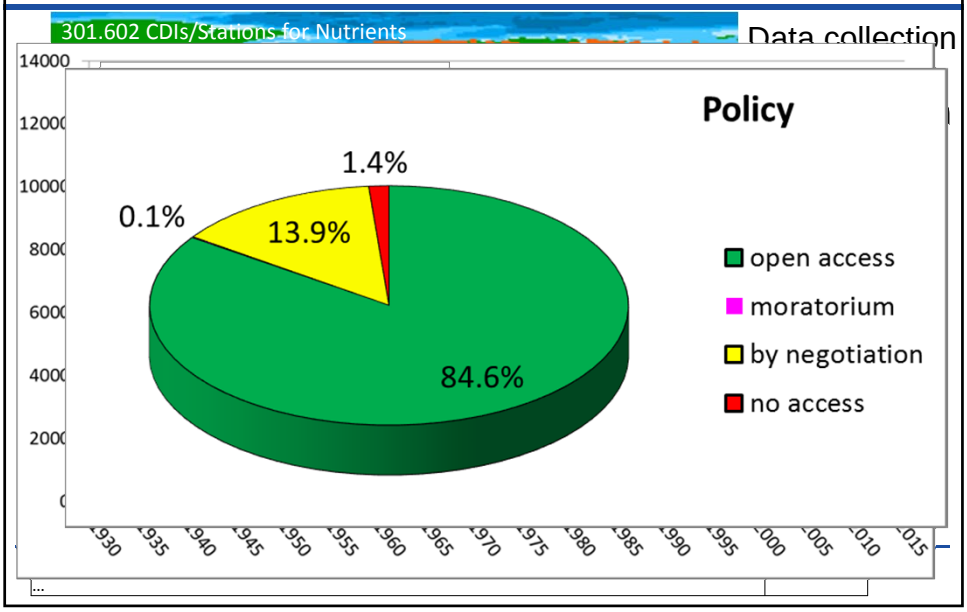
Aims to **collect**, **standardize**, **check the quality** of data developing **new services** to share and visualize information and products

Data harvesting and **products generation** are organized at **Regional level**

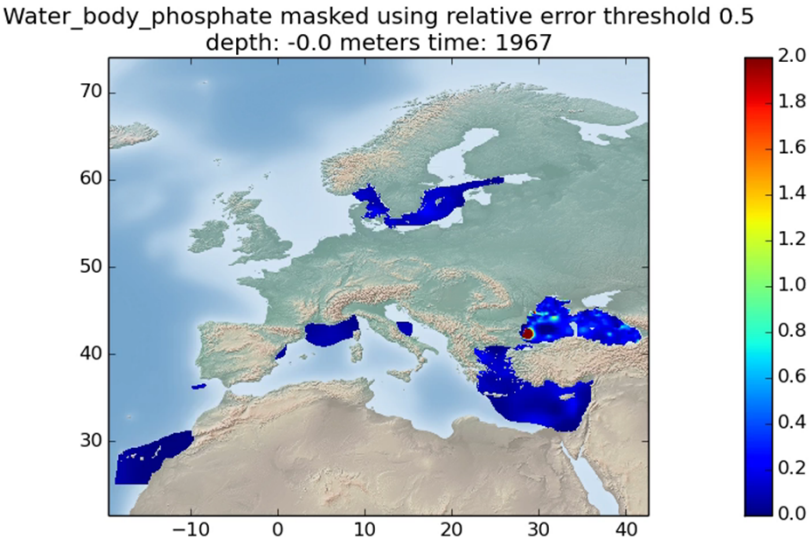
Single **Data Discovery and Access** interface for all the sources



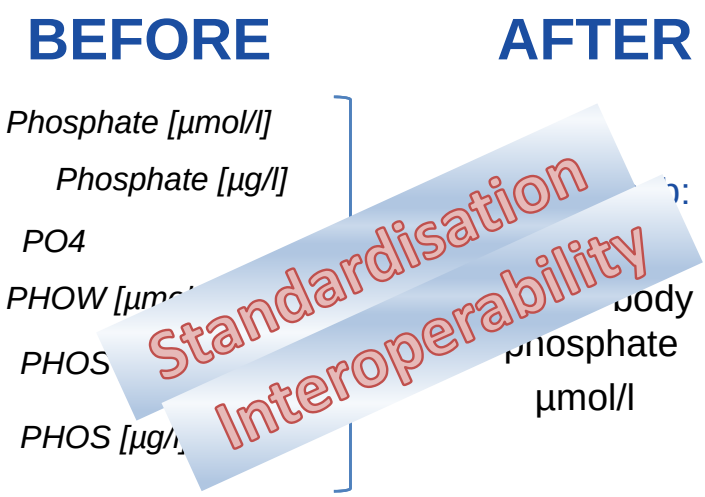
4. EMODnet Chemistry



4. EMODnet Chemistry



4. EMODnet Chemistry



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4. EMODnet Chemistry

Main target is to fit for purpose of the Marine Strategy Framework Directive by

- *Having regular and open **dialogue** with MSFD groups, EEA, DG ENV and Regional Sea Conventions to discuss their **requirements** and our **options***
- ***Optimisation** EMODnet Chemistry services and products for specific indicators*
- ***Formalisation** of cooperation*

Example: we are preparing an MoU with the Commission on the Protection of the Black Sea Against Pollution (Bucarest Convention)

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4. EMODnet Chemistry

Challenges now and near future:

- **Expand** data coverage and data centres connections (**research and monitoring**)
- **Optimise** the validation loop (dynamic harvesting, QA/QC) **in time** and types of parameters
- **Optimise** product generation
- Compute **additional indicators** (ratios, transparency,…)
- **Increase** performance of services
- **Integrate** EMODnet Chemistry in MSFD implementation

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5. EMODnet Biology

- Access to data on temporal and spatial distribution of marine species and species traits from several species groups from European seas.
- Trophic groups: phyto & zooplankon, algae, seagrasses, benthos, fish, reptiles, birds, mammals,
- Main components
  - WoRMS
  - EurOBIS-OBIS

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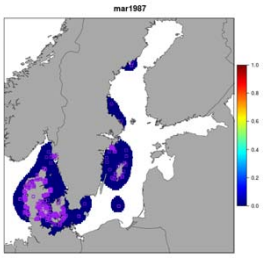
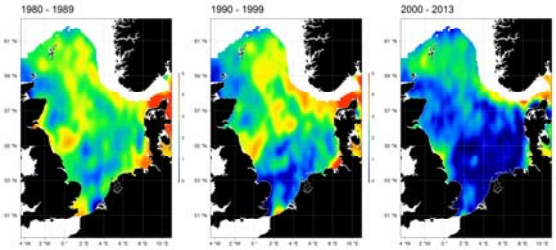
5. EMODnet Biology

- Both raw data, and data products - stores taxonomic and functional data
- Spatial modelling, indicating the trend in abundances of selected species
- Focus on 'indicator' species



Marenzelleria abundance showing multiple invasions in Baltic Sea



Gridded Cod (Gadus morhua) abundance illustrating the dramatic decrease of the cod stock in the North Sea.

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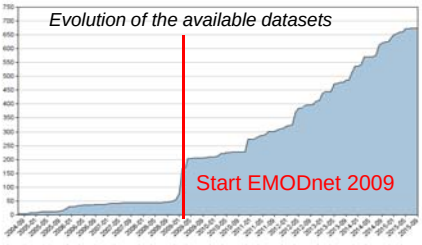
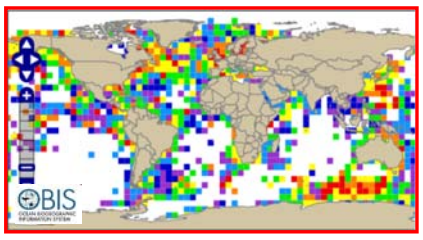
5. EMODnet Biology

We now have a mature European marine biodiversity data network

- Connecting 159 institutes from all European countries
- Making available 673 data collections (research oriented and monitoring data) making Europe main contributor to global OBIS IOC/IODE - UNESCO





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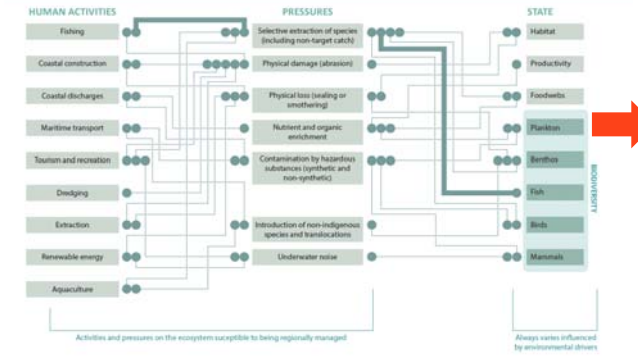
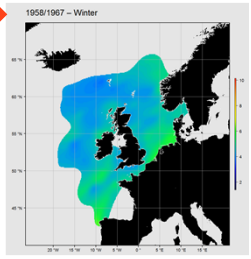
5. EMODnet Biology

- Contributing to **ICES' Ecosystem Overview** process

Ecosystem Overview for management of ICES ecoregion



Maps, time series and estimation error



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5. EMODnet Biology

- Key Challenges:
  - Open access policy
- Remaining issues :
  - Data availability & gaps
  - Create fit for purpose data products through real dialogue with stakeholders (e.a. MSFD)
- Recommendations for future development
  - Data products: from species to community characteristics
  - Including new biological observations, new datatypes from novel biodiversity sensors (e.a. near real time sensors: bio-optical sensors, GPS and acoustic tags…)

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6. EMODnet Physics

*Provides a **single point of free and open access to discover access and download marine real-time and archived data** on **physical parameters** of **European Seas** as monitored by fixed platforms, ferry boxes, ARGOs, gliders, HF radar, …*

Operational System

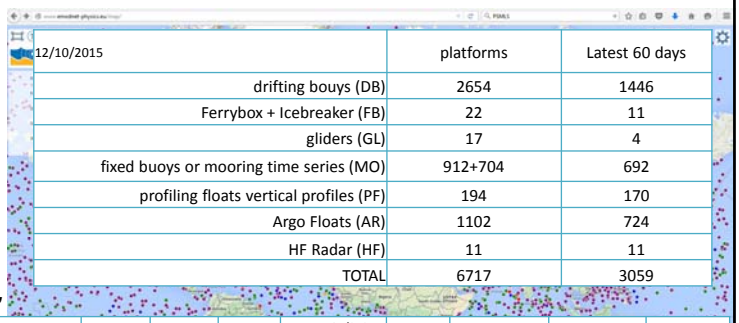
www.emodnet-physics.eu/map
www.emodnet-physics.eu/map/dashboard
www.emodnet-physics.eu/map/service/GeoServerDefaultWMS
www.emodnet-physics.eu/map/service/GeoServerDefaultWFS
www.emodnet-physics.eu/map/service/WSEmodnet2
thredds.emodnet-physics.eu:8080/thredds/catalog.html

EMODnet

6. EMODnet Physics

Results:

- ***One point of access***
- ***Strong cooperation with Copernicus, SeaDataNet and EuroGOOS***
- ***New and more contributors***
- ***More visibility to data providers***
- ***New and more data and users***
- ***More harmonization, standardization***
- ***Cross-fertilization***
- ***Up to date interoperability services***



12/10/2015	platforms	Latest 60 days
drifting bouys (DB)	2654	1446
Ferrybox + Icebreaker (FB)	22	11
gliders (GL)	17	4
fixed buoys or mooring time series (MO)	912+704	692
profiling floats vertical profiles (PF)	194	170
Argo Floats (AR)	1102	724
HF Radar (HF)	11	11
TOTAL	6717	3059

parameter group/ # time series	Water Temp	Waves and Winds	Sea Level	Water Salinity, Conductivity, Density	Currents	Light Attenuation	Atmospheric	Others
latest 60days	2460	262	428	932	64	19	1082	1129
total	3830	336	549	1240	86	28	1686	1648
validated historical	440	171	397	132	365	35	39	210

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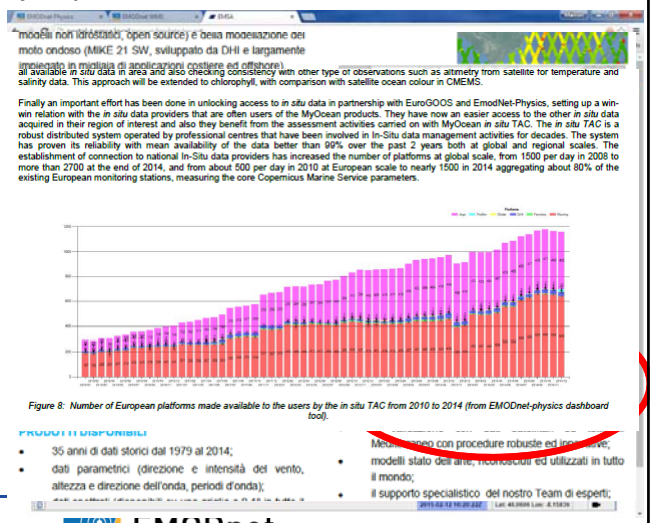
6. EMODnet Physics

examples of how the data of the portal was used



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6. EMODnet Physics

- **key challenges and remaining issues to be resolved**
  - Keep engaging data originators
  - Improving the accessing, discovering, plotting and downloading features of the portal
  - connecting more historical validated data
  - further products (e.g. annual/periodic average) accessible via both the portal and interoperability services (e.g. explore/exploit more THREDDS)
  - ice data and sea level trends on the portal
  - Working on Single Sign On/Open-ID in collaboration with Mercator – IFREMER and SeaDataNet network

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6. EMODnet Physics

- **recommendations for future development of the thematic portal in the next phase**
  - new providers and new/more data (e.g. underwater noise, ship opportunity, mammals…)
  - a continuous data flow from Near Real Time to validation
  - improving interoperability layers (e.g. extend THREDDS and OGC catalogues) and services (dashboard, tracking and reporting tools)
  - wider audience (e.g. new data plots, single parameters download …)
  - more basic products (e.g. annual seasonal averages…)
  - ready to ingest and store data from past projects, organizations outside main networks
  - Real Time data and big data visualization
  - easier direct interaction between providers and users

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7. EMODnet Human Activities

Born in late 2013, Human Activities is the '**youngest member of the EMODnet family**'

It aims to become the **main entry point** for spatial data on **marine and maritime activities** in the EU

We don't collect new data!

We **collate** existing information, **harmonise** it and make it available under **interoperable formats**

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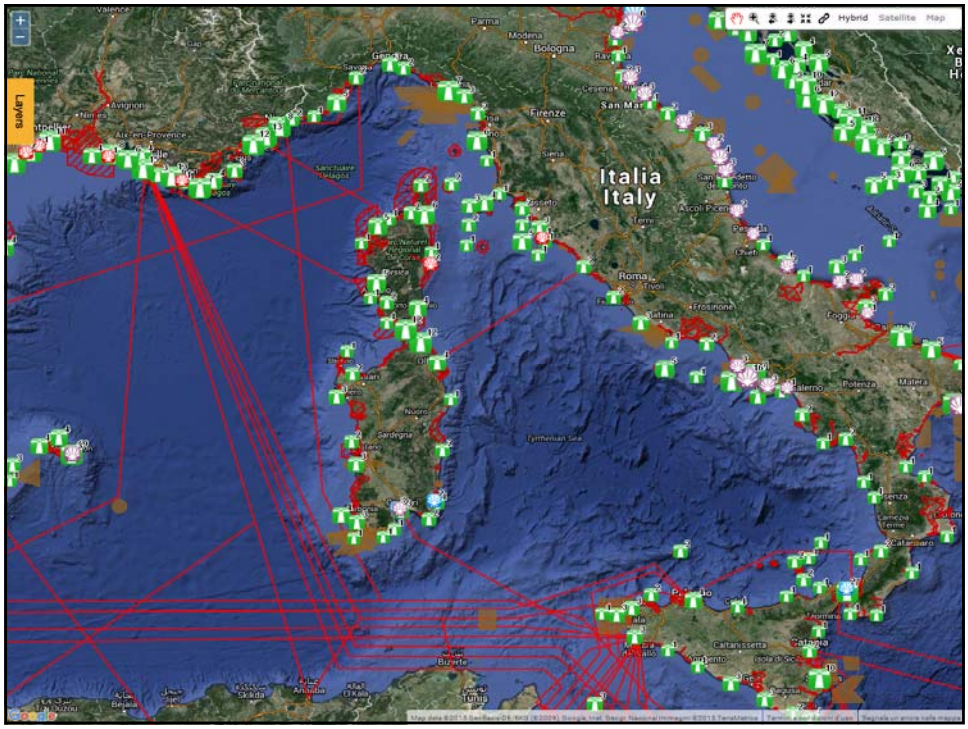
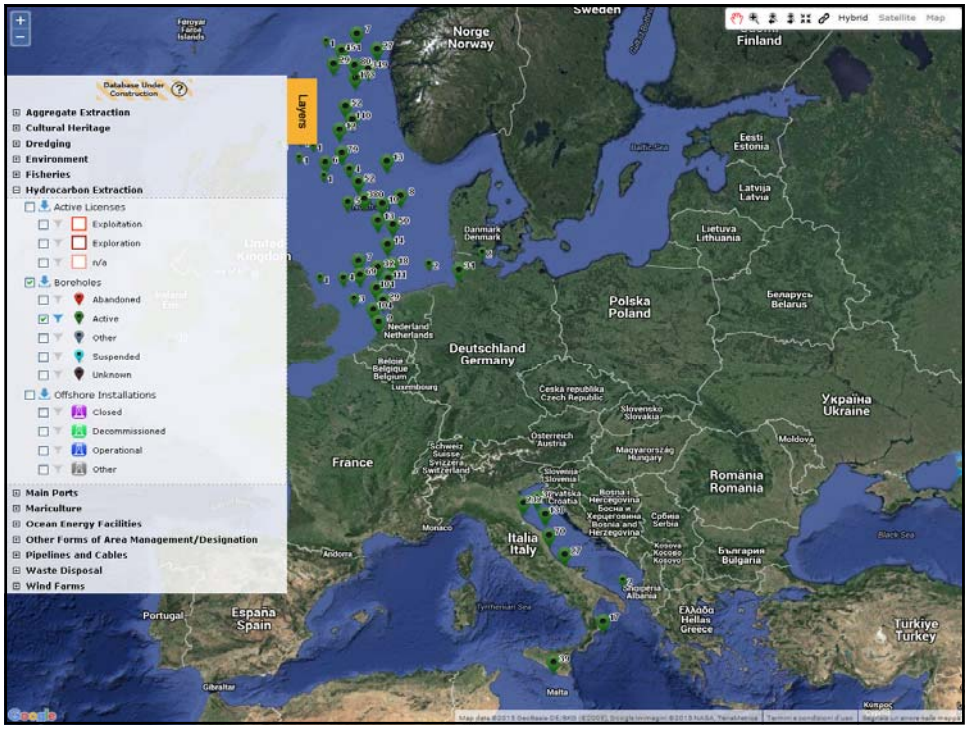

Layers
Hybrid
Satellite
Map
Italia
Italy
Firenze
Roma


Layers
Database Under Construction
Aggregate Extraction
Cultural Heritage
Dredging
Environment
Fisheries
Hydrocarbon Extraction
Active Licenses
Exploitation
Exploration
n/a
Boreholes
Abandoned
Active
Other
Suspended
Unknown
Offshore Installations
Closed
Decommissioned
Operational
Other
Main Ports
Mariculture
Ocean Energy Facilities
Other Forms of Area Management/Designation
Pipelines and Cables
Waste Disposal
Wind Farms
Norge
Norway
Sweden
Finland
Eesti
Estonia
Latvija
Latvia
Lietuva
Lithuania
Danmark
Denmark
Polska
Poland
Беларусь
Belarus
Deutschland
Germany
Nederland
Netherlands
Belgique
Belgium
Luxembourg
Ceska republika
Czech Republic
Slovensko
Slovakia
Україна
Ukraine
Moldova
Österreich
Austria
Magyarország
Hungary
Schweiz
Suisse
Svizzera
Switzerland
France
Slovenija
Slovenia
Hrvatska
Croatia
Bosna i Hercegovina
Босна и Херцеговина
Bosnia and Herzegovina
Србија
Serbia
Romania
Monaco
Andorra
Italia
Italy
Kosovo
Косово
Kosovo
България
Bulgaria
Shqipëria
Albania
Ελλάδα
Hellas
Greece
Türkiye
Turkey
Portugal
España
Spain
Gibraltar
Malta
Κύπρος

7. EMODnet Human Activities

Robert

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7. EMODnet Human Activities

Key challenges

- Lots of people advocate data sharing, not that many actually share it
- Harmonising data from different sources is a time consuming activity
- Poor coverage of some countries / data themes

Recommendations for the next phase

- Improve current coverage
- Oceans have no boundaries: extend data collection to non-EU neighbouring countries
- Include Maritime Spatial Plans
- Liaise with INSPIRE

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Thank you
for your attention
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