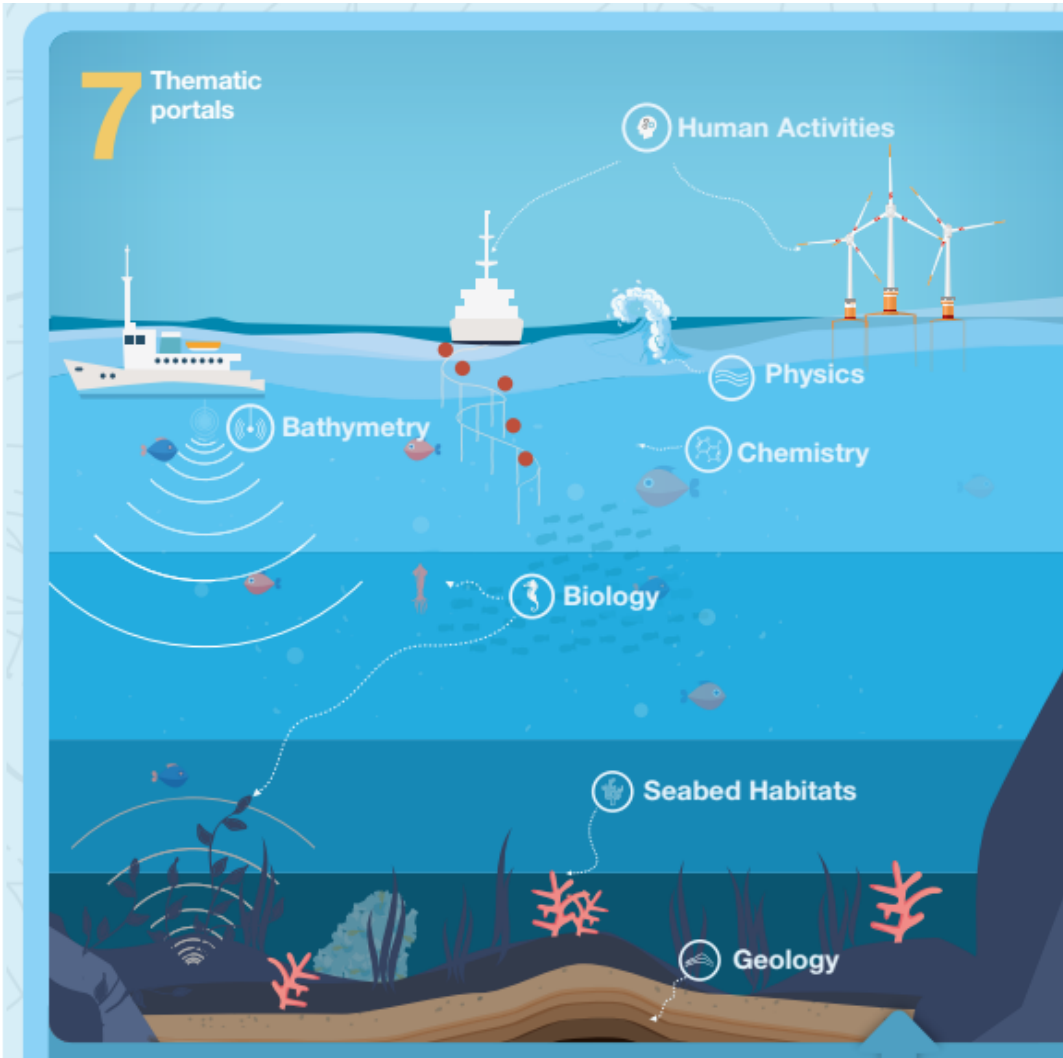# EMODnet: Open Source Marine Data, Digital Products and Services for Europe and beyond

Patrick Gorringe

SMHI/EMODnet Physics/EMODnet Secretariat

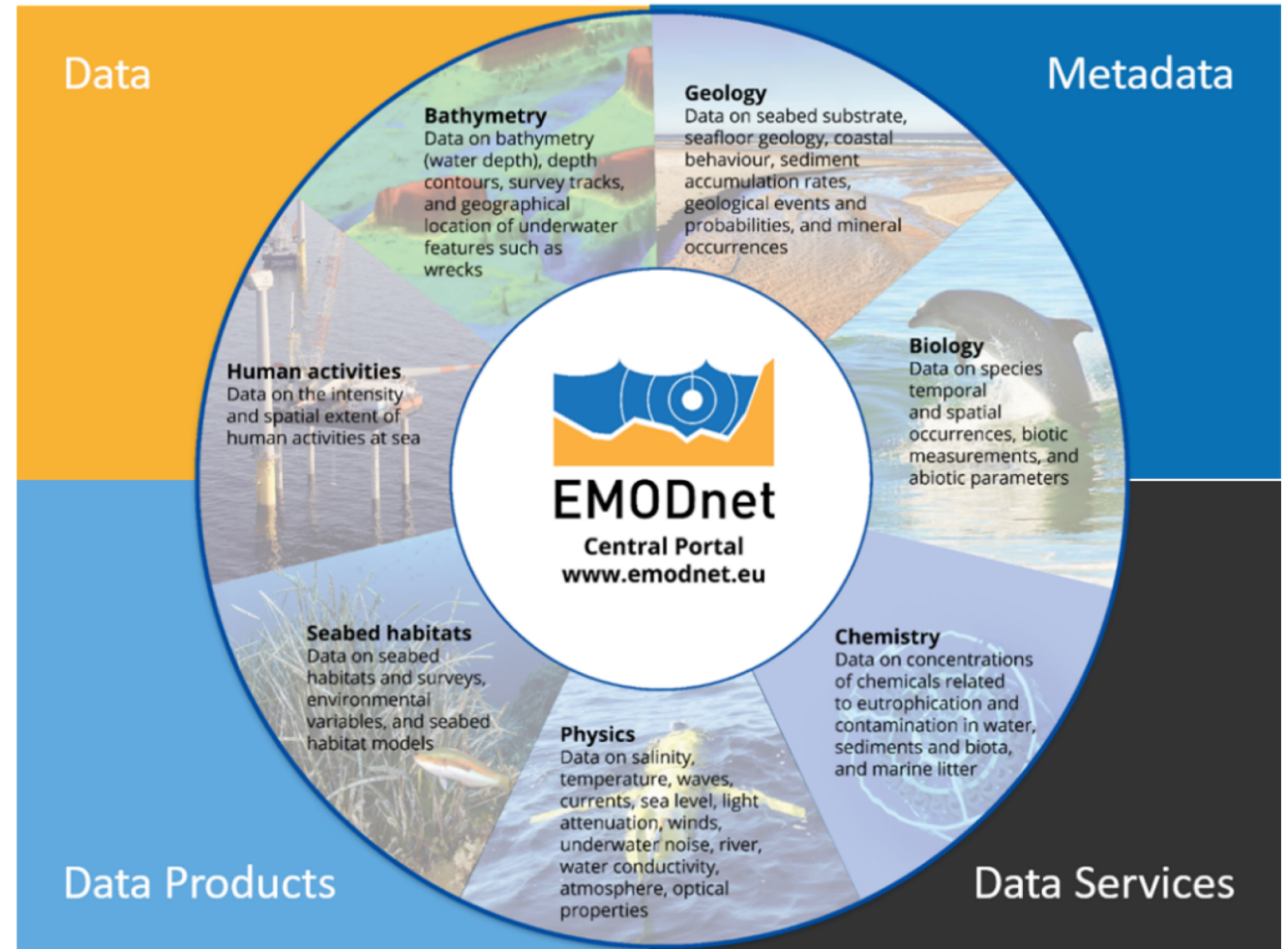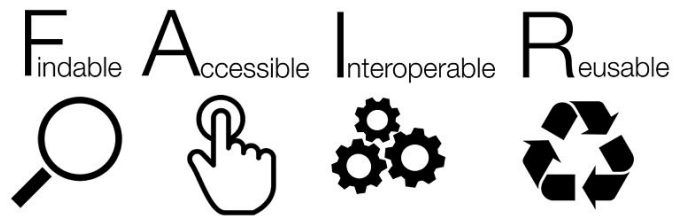www.emodnet.eu

What is EMODnet?

- a **long-term European marine knowledge** initiative funded by the EC (DG MARE);
- **marine knowledge broker**, providing open and free access to marine data, products, services;
- **Large network of >150 organizations, experts & wider community** of data providers and users;
- **Complimentary and aligned to other data services** e.g. Copernicus Marine Service (satellite/remote sensing focus)
- **data & products from the surface to seafloor** (focus on data collected in water *in situ*);
- **7 thematics & central portal & data ingestion & Secretariat**

What is the added value of EMODnet?

Data services and web services to discover open and free access to data and data products from a trusted source

- INSPIRE and FAIR data principles
- Aggregated, harmonized multi-parameter data sets
- Searchable metadata
- Data services (maps, query)
- Integrated data products
- Web services e.g. OGC, machine-machine readability e.g. WMS, WFS, WebS

Findable Accessible Interoperable Reusable

https://github.com/EMODnet/Web-Service-Documentation

EMODnet
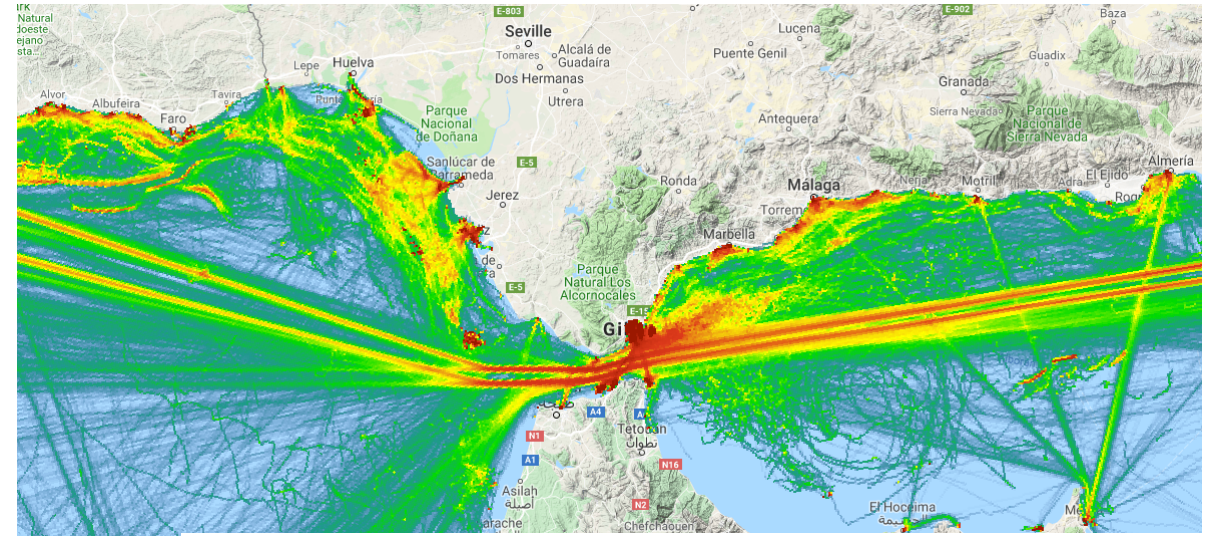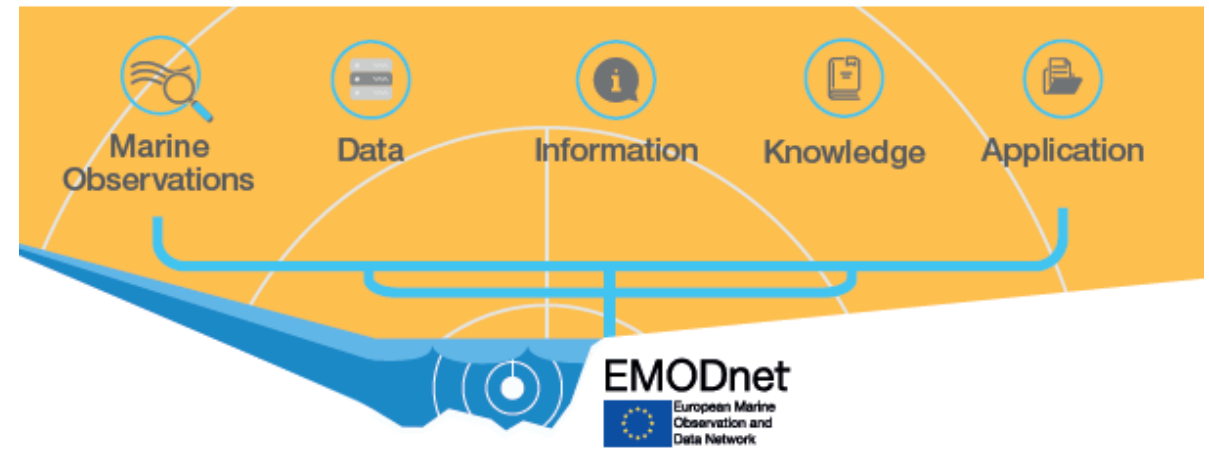
What is the added value of EMODnet?

Collect data once, use many times.
Visualize and make data come alive.

- reduce uncertainty;
- increase productivity and cost-effectiveness;
- add value and impact to your data;
- stimulate innovation.

Linking ocean - climate

- EMODnet is offering a public service of "blue" data for the EU Green Deal to meet the targets of EU Climate Pact / Climate Action

From raw data to real-life applications

Marine Observations — Data — Information — Knowledge — Application

EMODnet
European Marine Observation and Data Network

Vessel density by EMODnet Human Activities. The map is a grid with 1 square kilometre cells, each with a colour gradient for vessel density.
www.emodnet-humanactivities.eu

HUMAN ACTIVITIES

EMODnet

The EMODnet Central Portal provides a single point of access to the 7 thematic areas: Centralisation towards a common map viewer
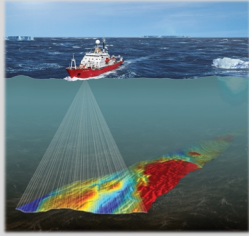
www.emodnet.eu
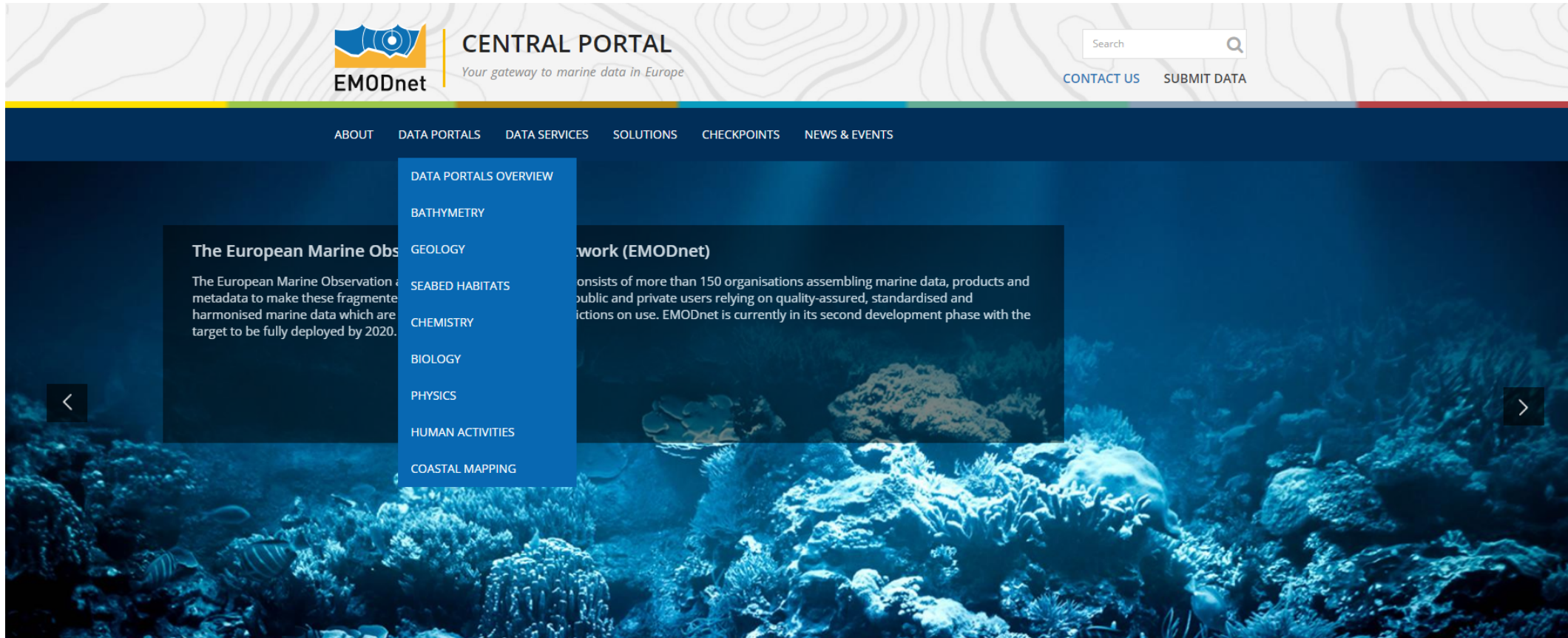
Discover the EMODnet tutorials to help you find the data and data products you need!
https://www.emodnet.eu/en/videogallery

Thematic DATA coverage by the portals

Bathymetry	Geology	Seabed habitats	Physics	Chemistry	Biology	Human activities

Survey tracks

Water depth and depth profiles

Undersea features

Wrecks

High resolution bathymetry in coastal areas

Seabed substrate

Sediment accumulation rates

Seafloor lithology

Seafloor stratigraphy

Coastal behaviour

Geological events and probabilities

Mineral occurences

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

Individual seabed habitat maps from surveys

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

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

Acidity

Antifoulants

Chlorophyll

Dissolved gases

Fertilisers

Hydrocarbons

Marine litter (micro, beach, seafloor)

Heavy metals

Organic matter

Polychlorinated biphenyls

Pesticides and biocides

Radionuclides

Silicates

Occurrences and abundances of species of:

Phytoplankton

Zooplankton

Macro-algae

Angiosperm

Fish

Reptile

Benthos

Bird

Sea mammal

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

Check them out!

emodnet.eu/data-portfolio

EMODnet

Thematic DATA PRODUCT coverage by the portals

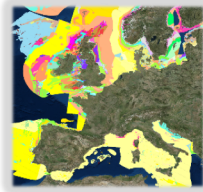| Bathymetry	Geology	Seabed habitats	Physics	Chemistry	Biology	Human activities
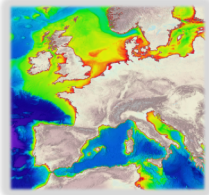
Digital Terrain Model of:

Survey tracks

Water depth and depth profiles

Undersea features
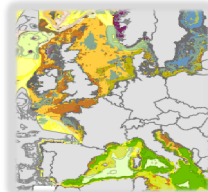
Wrecks

High resolution bathymetry in coastal areas

Check them out!

emodnet.eu/ data-portfolio

Maps of:

Seabed substrate

Sediment accumulation rates

Seafloor lithology

Seafloor stratigraphy

Coastal behaviour

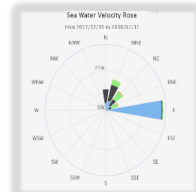Geological events and probabilities

Mineral occurences

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, …)
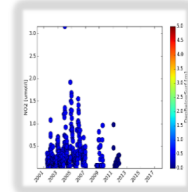
Time series

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
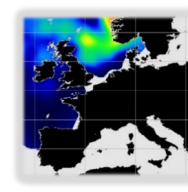
Atmospheric parameters

Ice cover

Underwater noise

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)

Map viewer of:

Phytoplankton

Zooplankton

Macro-algae

Angiosperm

Fish

Reptile

Benthos

Bird

Sea mammal

Dynamic gridded abundance plots showing geographical variability of species of:

Benthos

Birds

Fish

Sea mammals

Micro-organisms

Physoplankton

Reptiles

Zooplankton

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

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Sea-basin Checkpoints

- 2013-2018
- By testing the data against specific end-user challenges;
- Checkpoints evaluated how well the current monitoring systems and data collection frameworks provided data to meet the needs of users;
- Highlighted data gaps, duplications and bottlenecks at sea-basin scale.
- Climate change and the related coastal protection/management were common challenges of all Sea-basin Checkpoints.
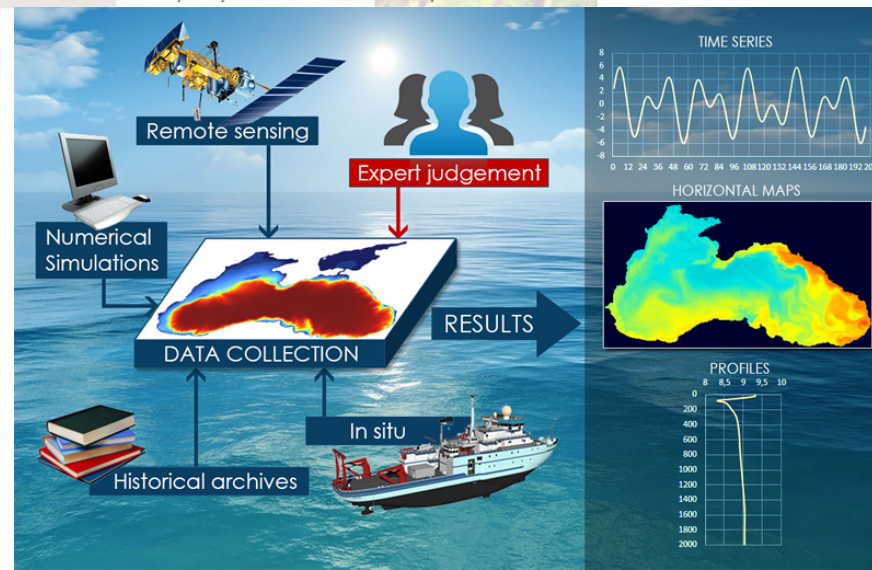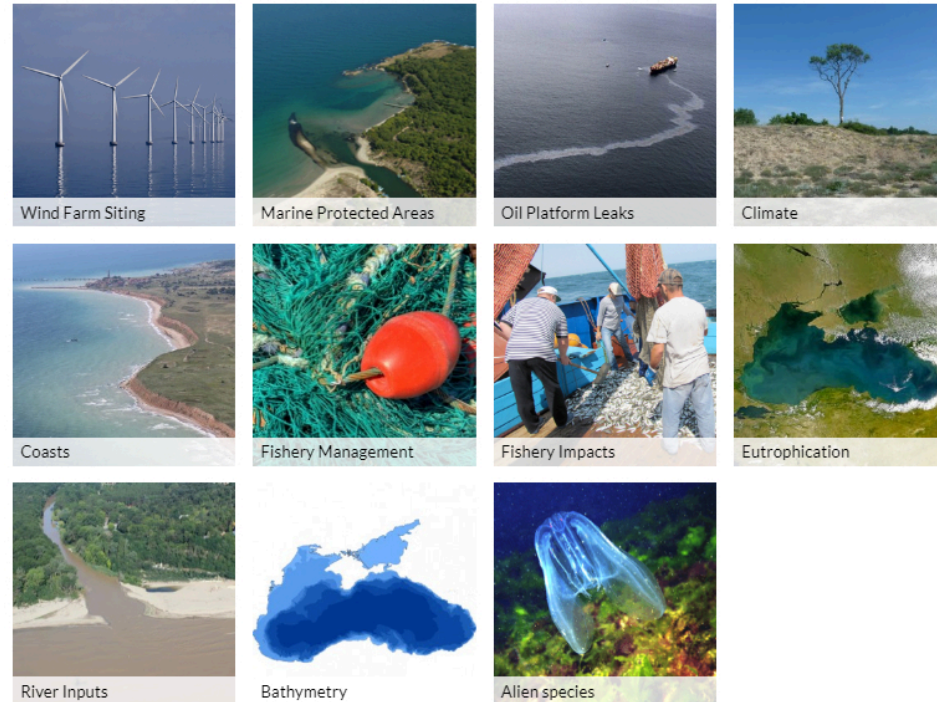
EMODnet

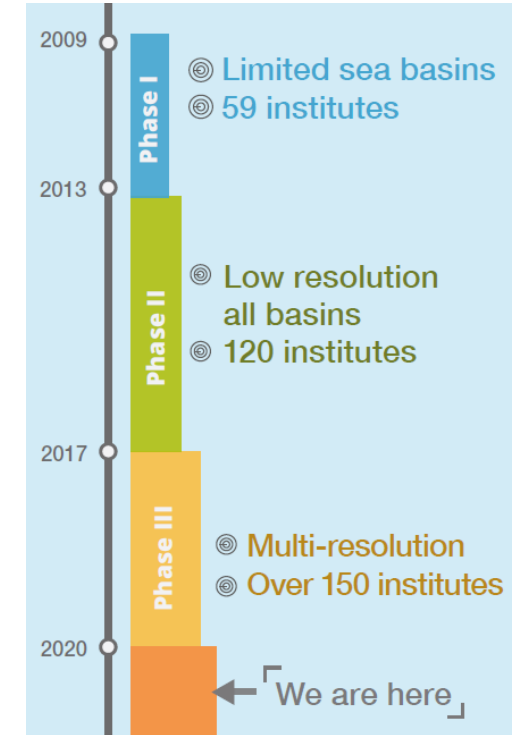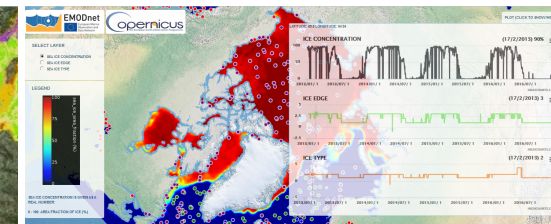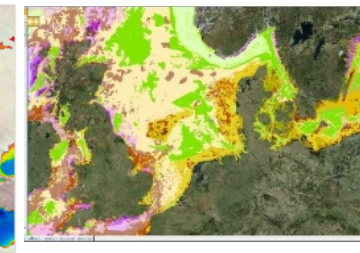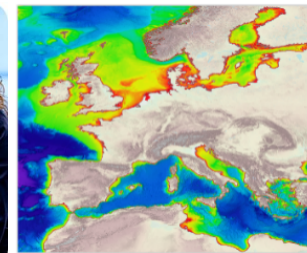# EMODnet: A decade of achievements – connecting marine data to knowledge
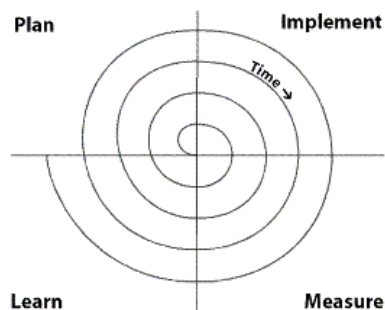
- *From regional to pan-European coverage and onwards to global remit*
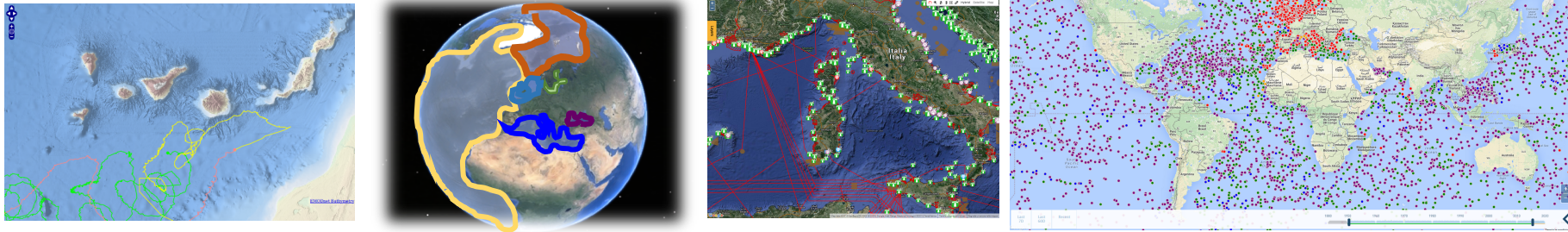
- *From small network to a movement - bringing people & ideas together*



- *From prototypes to an operational, mature and user-driven distributed infrastructure*

2009 — Phase I — ◎ Limited sea basins ◎ 59 institutes

2013 — Phase II — ◎ Low resolution all basins ◎ 120 institutes

2017 — Phase III — ◎ Multi-resolution ◎ Over 150 institutes

2020 — ← We are here

EMODnet

EMODnet: A decade of achievements – connecting marine data to knowledge

EMODnet Physics – global coverage and a service to international communities
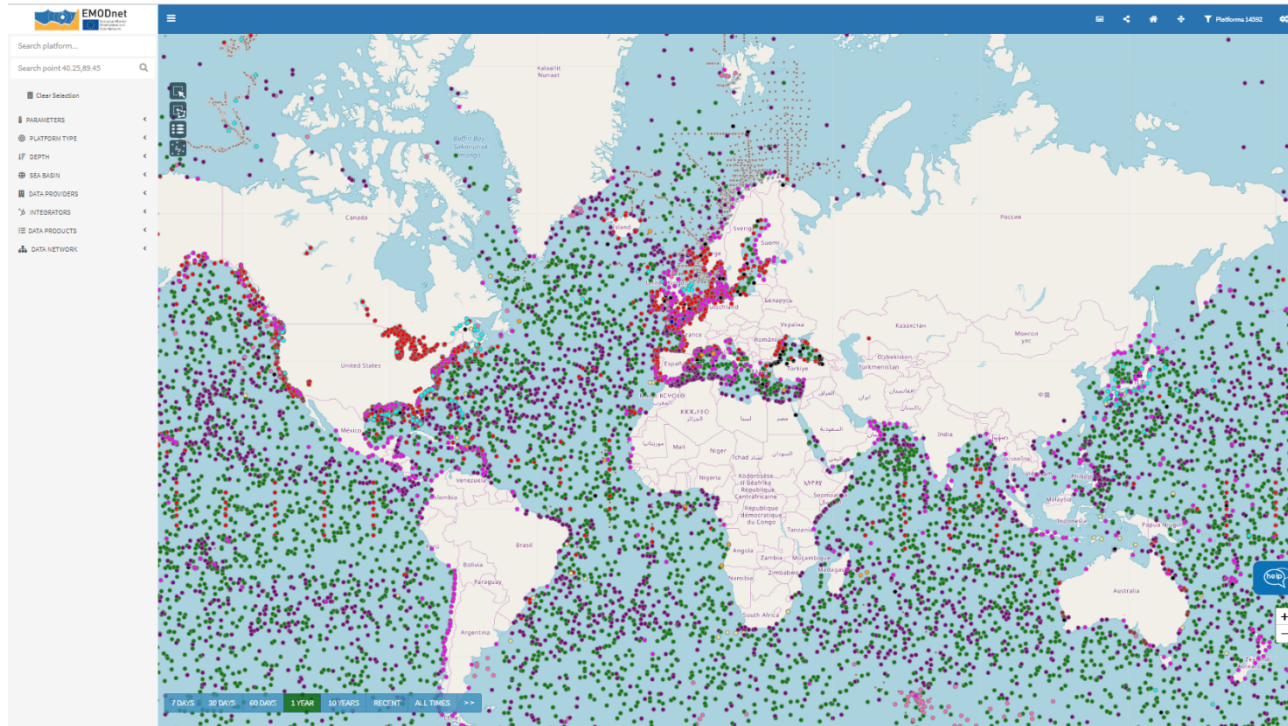
- >600,000 global datasets e.g. physics, temperature
- Near real-time data/operational, historical validated data sets, reprocessed data/ products
- Close collaboration with Copernicus Marine Service (CMEMS) *in situ* Thematic Assembly Centre (INSTAC) and EuroGOOS
- New datasets on river runoff, noise, total suspended matter,....
- Connecting to EU marine RI's
- Southern Ocean Observing System (SOOS) interface with centrally-curated circumpolar datasets
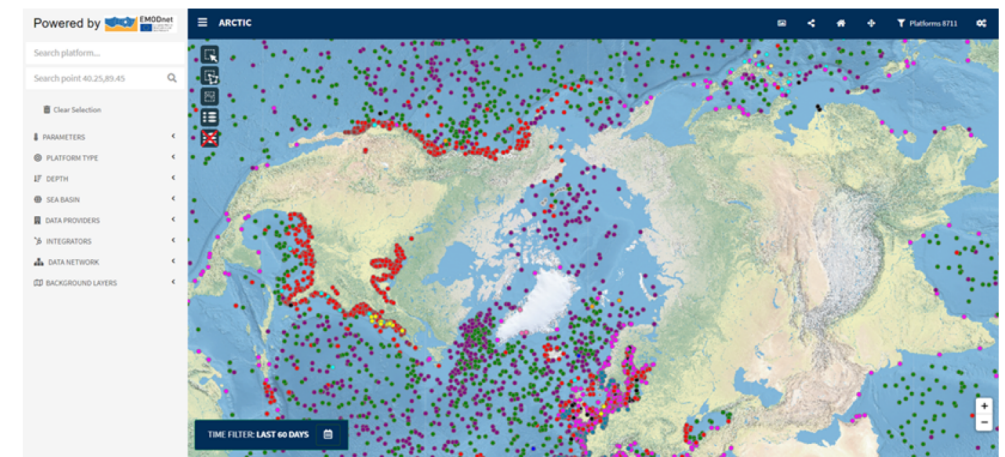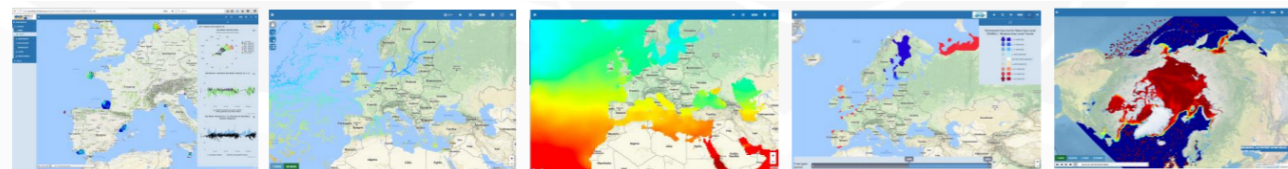
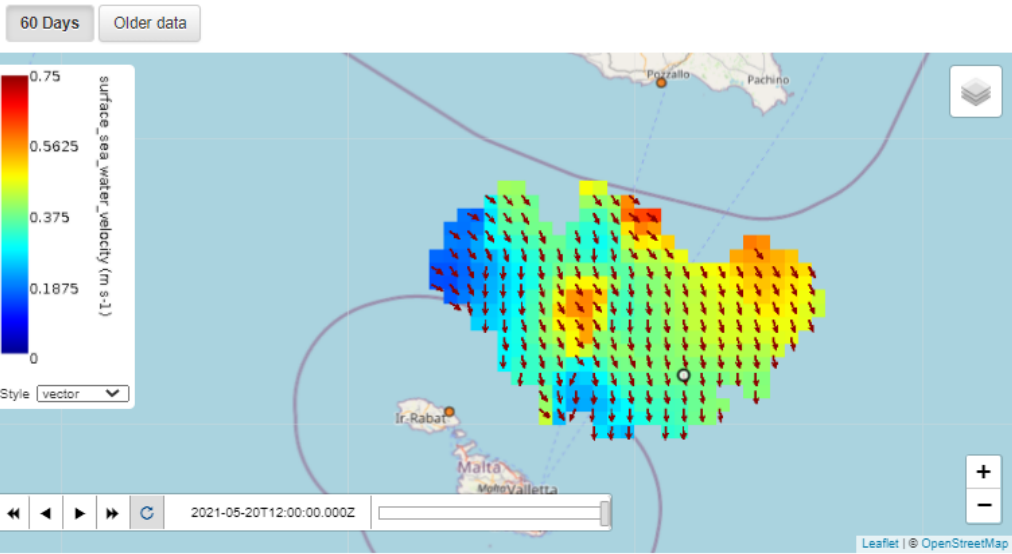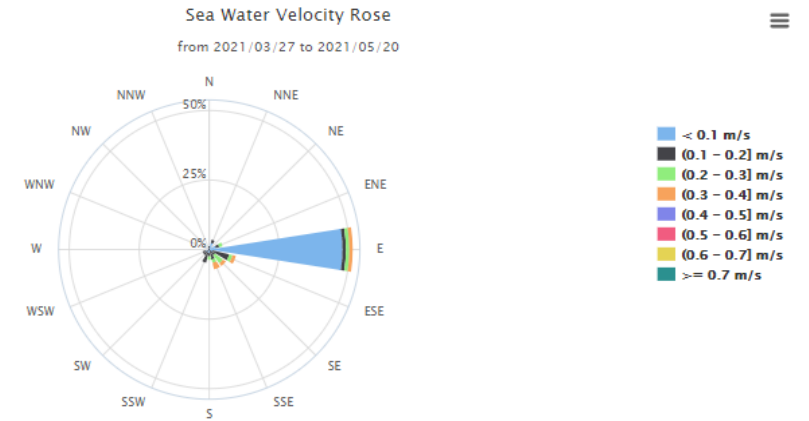# EMODnet Physics – global coverage and a service to international communities
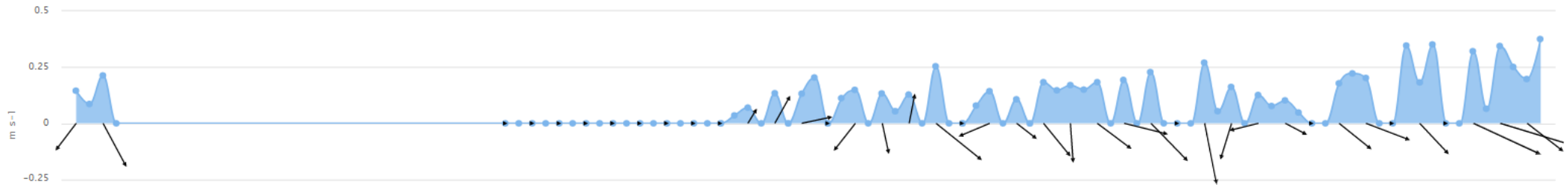
Bringing together diverse ocean observing communities: Fishing for Data
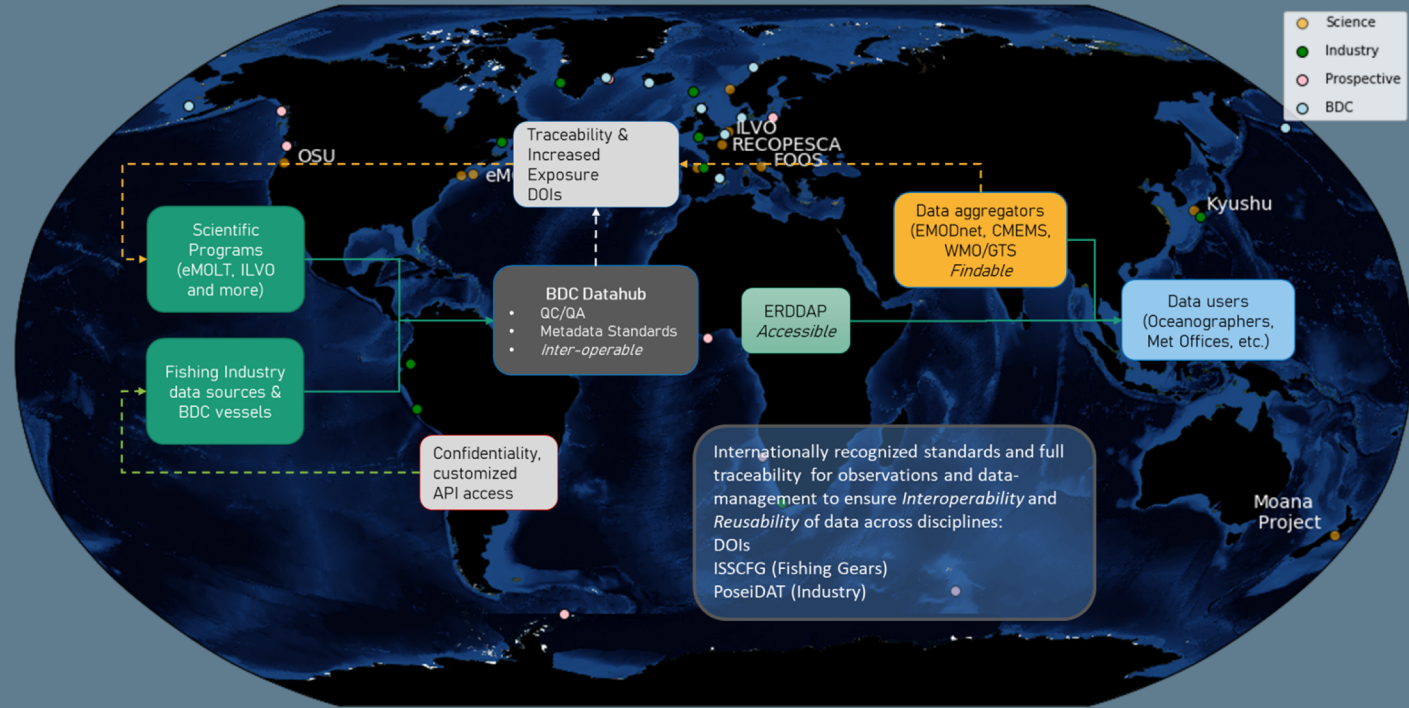
- **EMODnet physics helps** emerging networks **to provide a global view**, provide **global questions and answers**, **provides support** and acting as a **integrator** and **enabler**

- to enhance the cooperation

- increase the accessibility to marine data

- agree on standards, data flow,….

EMODnet Data Ingestion

EMODnet Data Ingestion

- EMODnet Data Ingestion is a component of the present EU marine data management infrastructure
- **Identify** potential data sources and data providers
- **Reach out** to potential data providers
- **Motivate** data providers to participate with their data submissions
- Market and promote the Data Ingestion service and its function in the overall EMODnet scheme
- Data Centres function as EMODnet ambassadors
- Links at all EMODnet portals and other marine data management infrastructures such as CMEMS, SDN,….

EMODnet Data Ingestion

Hello.

My name is XXXX XXXX, and I work in the newly-created Decarbonization group within XXXXX. We have discussed various ways we could **contribute to the understanding and prevention of climate change**, and one such possibility we have identified is to **share** the weather **data collected by 250 of our ocean-going container vessels**. This data is collected every ten minutes and includes the following data points:

- Position, Ambient sea temperature, Ambient air temperature, Ambient air pressure, Wind speed, Wind direction

We have **26 million observations** already and are adding **13 million observations each year**. The data is already streamed to shore automatically and stored in a central database.

To **aid climate monitoring and research**, XXXXX is considering making this dataset available to the global scientific community **free of charge** if it would **bring value to climate monitoring** and research. Therefore, we'd like to hear whether or not this dataset has sufficient value that you would be interested in including it into your observing system.

EMODnet

Future Outlook: What's next for EMODnet?
Continued evolution of EMODnet, to deliver a fit-for-purpose user-driven service
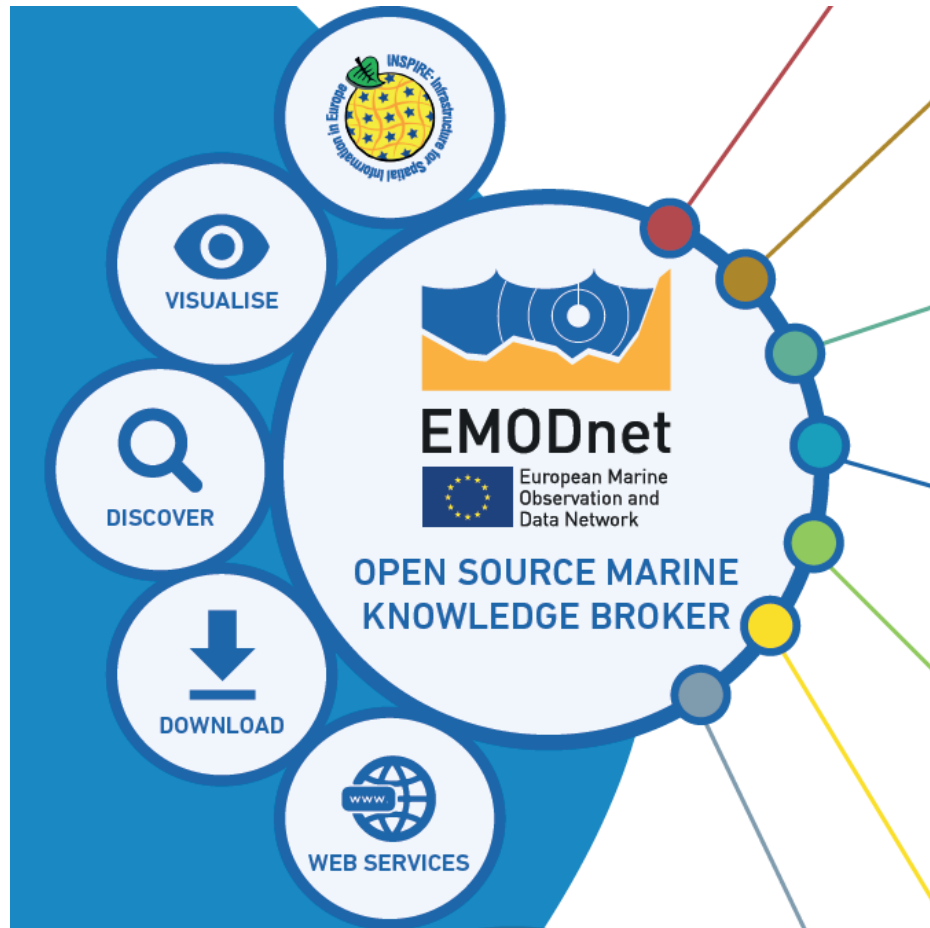
- **Build on existing capability,** as a long-term European trusted data service;

- **Consolidation, centralisation and Interoperability**;

- **User-driven** with clear, user-friendly interfaces.

Future Outlook *What's next for EMODnet and the wider community?*
EMODnet 2nd Open Conference and Jamboree, 14-16 June 2021

Key themes:

- **EMODnet Partnerships & collaborations:** Data producers, data management services, data and data product users, long-term data initiatives e.g. Copernicus Marine Service (CMEMS);

- **EMODnet for user tracks:** Policy, Industry, Research, Society;

- **EMODnet for Global:** Supporting the UN Decade of Ocean Science, UN 2030 Agenda;

- **Ocean Observing and Data Collection:** including a workshop on European Ocean Observing, 16 June PM

    https://www.emodnet.eu/en/conference2021

A full week of EMODnet Jamboree for the EMOD-network

Co-organisers: EMODnet Secretariat, VLIZ & EC (DG MARE)

EMODnet

European partnerships include:

4 Regional Sea Conventions
OSPAR
HELCOM
UNEP-MAP
Black Sea Convention

Dialogue with European Research Infrastructures, data repositories, projects, for optimizing data sharing and flow e.g.,
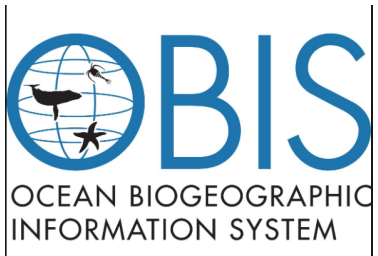
Global context, collaborations & contributions

EMODnet collaborates internationally as an open source data and data product and web services provider, collaborator and contributor of best practice and technical solutions to European and international marine data initiatives:

EMOD-PACE

Global collaborations: Future Outlook
Strengthening Partnerships for International Interoperability and Impact


- **EMODnet:** A key partner for Open Data, Open Science and Data diplomacy in Europe, and beyond

- **Interoperable data discovery and access,** in collaboration with other key data services

- **Further diversifying data parameters and sources** (e.g. industry, citizen science)

- **Extending FAIR** to FAIR, CARE and TRUST

EMODnet

Thank you!

- **Discover** EMODnet **data** and **data products**

- **Connect** with the online EMODnet **community** @EMODnet (Twitter, LinkedIn and Facebook)

- **Help shape the future of EMODnet! Join us for the EMODnet Open Conference & Jamboree** 14-18 June 2021, Ostend, Belgium

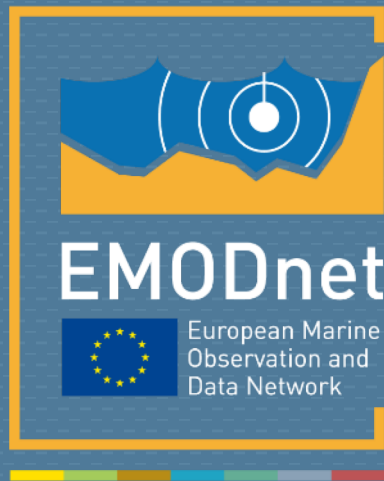**www.emodnet.eu**

info@emodnet.eu
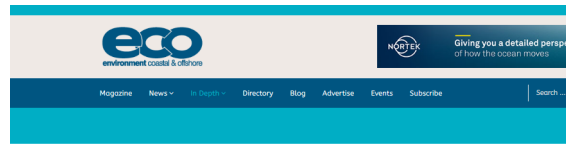
Breaking Borders in Ocean Information: A European Success Story

EMODnet Secretariat   POSTED ON OCTOBER 14, 2020

https://bit.ly/2IMZAgv

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www.emodnet.eu

Your gateway to marine data in Europe