



SeaDataCloud

European Marine Data Exchange



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Technical coordinator SeaDataCloud, ODIP, EMODnet HRSM,
EMODnet Chemistry, and EMODnet Ingestion

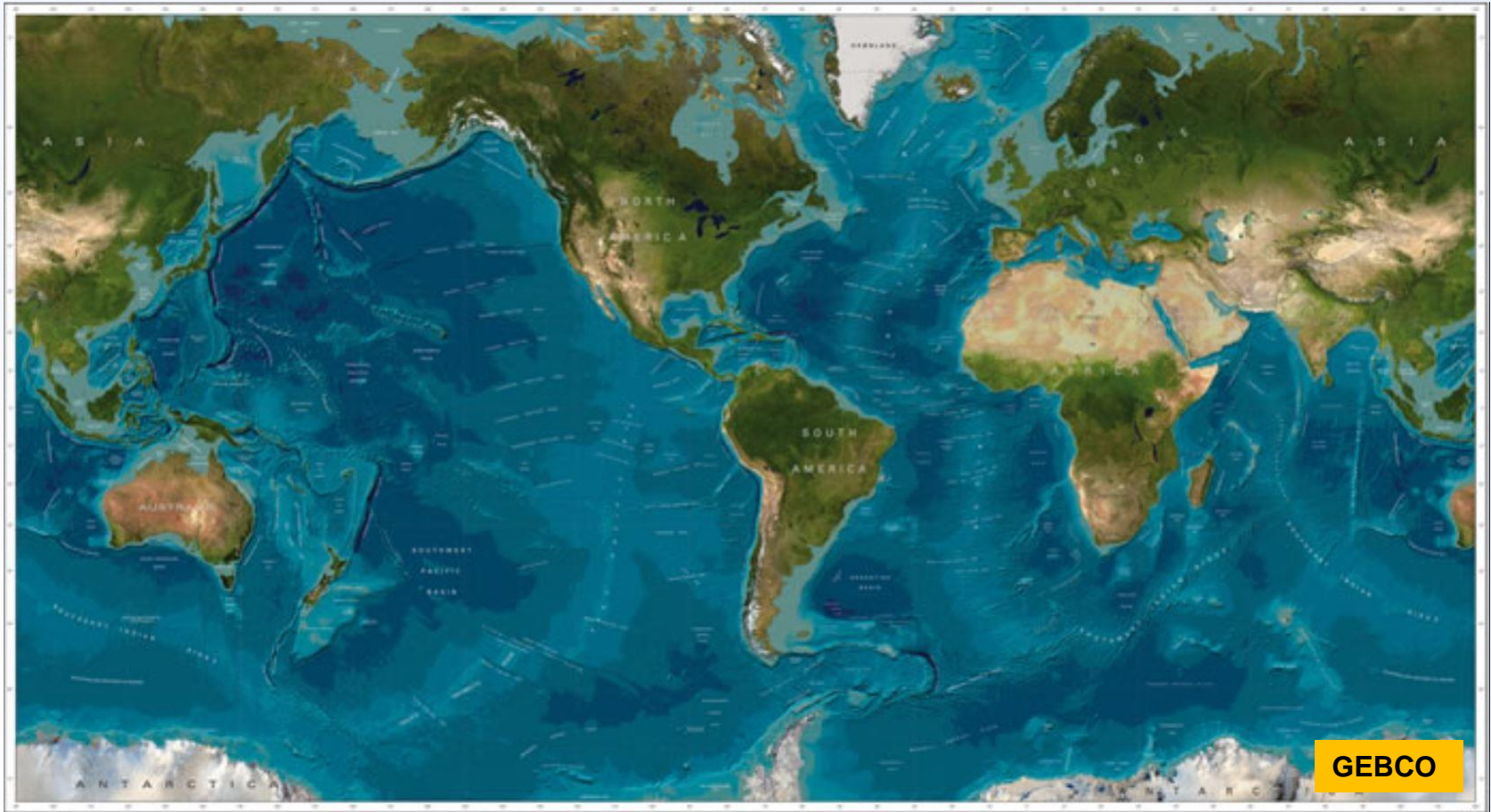
SDB Day, Herrsching - Germany, 6 June 2018



EuroGOOS
European Global Ocean
Observing System

Copernicus

Oceans and seas are important



Climate, Energy, Food, Tourism, Shipping, Health,



Marine data relevant for many uses:

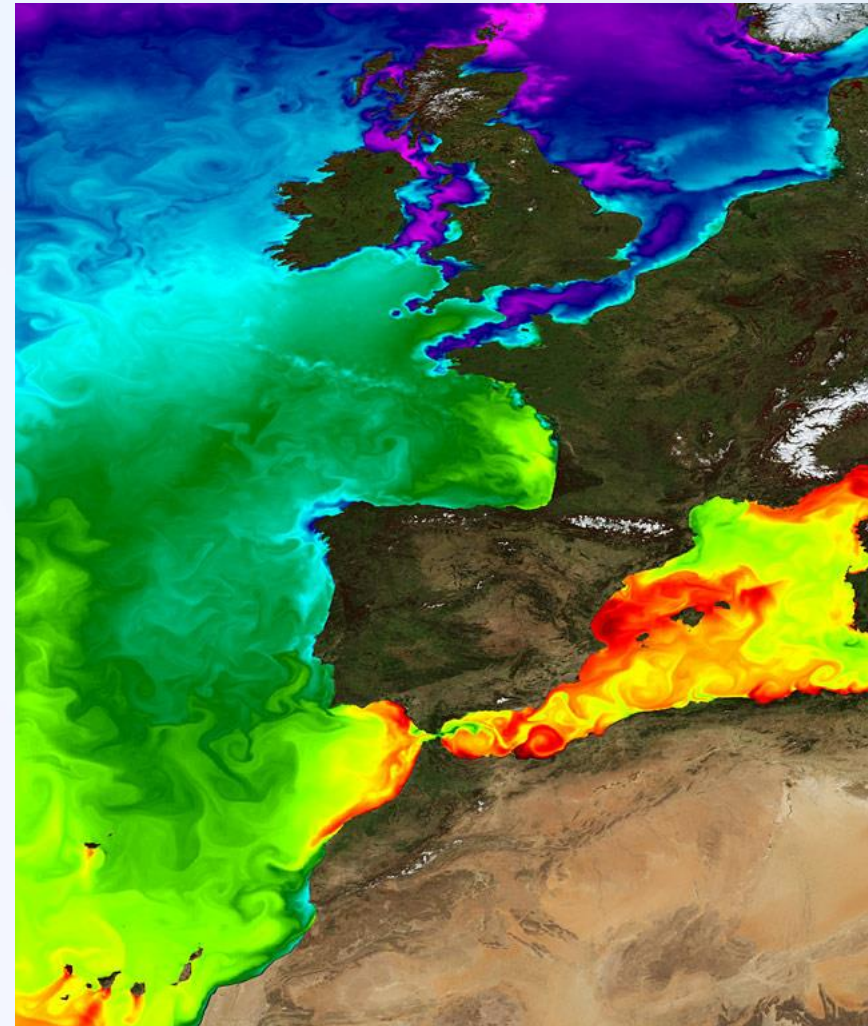
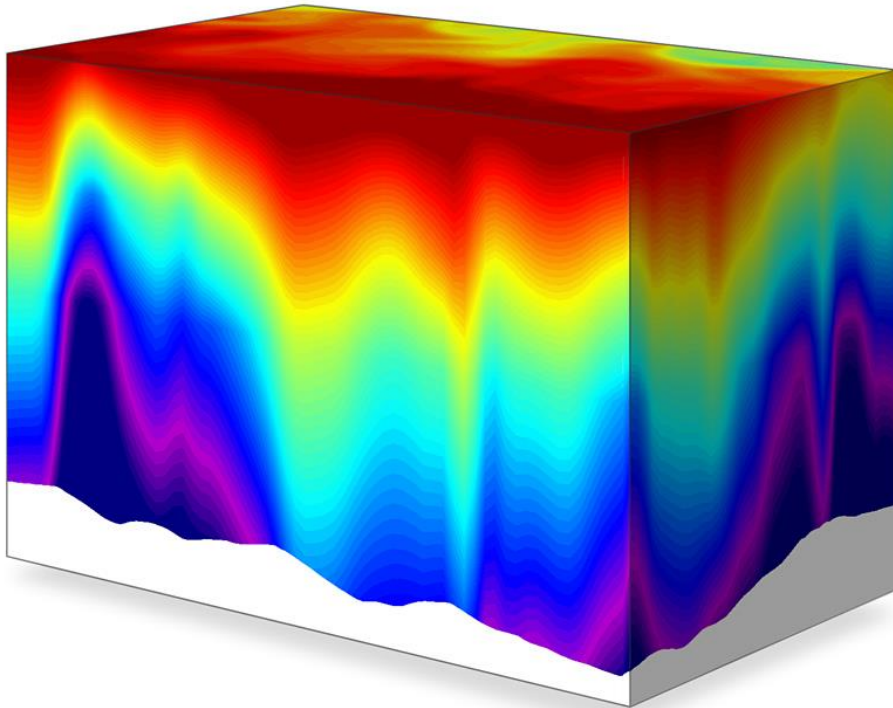
- Scientific Research to gain knowledge and insight
- Monitoring and assessment (water quality, climate status, stock assessment)
- Coastal Zone Management
- Modelling (including hindcast, now-cast, forecast)
- Dimensioning and supporting operations and activities at sea (shipping, offshore industry, dredging industry, ..)
- Implementation and execution of marine conventions for protection of the seas
- Implementation of international Directives, such as in Europe directives for water (WFD), marine strategy (MSFD), coastal zone management



Users originate from government, science sector, and industry, nationally and internationally

Input for models: analyses and forecasts :

- Operational oceanography
- Physical and meteorological modelling
- Ecosystem modelling

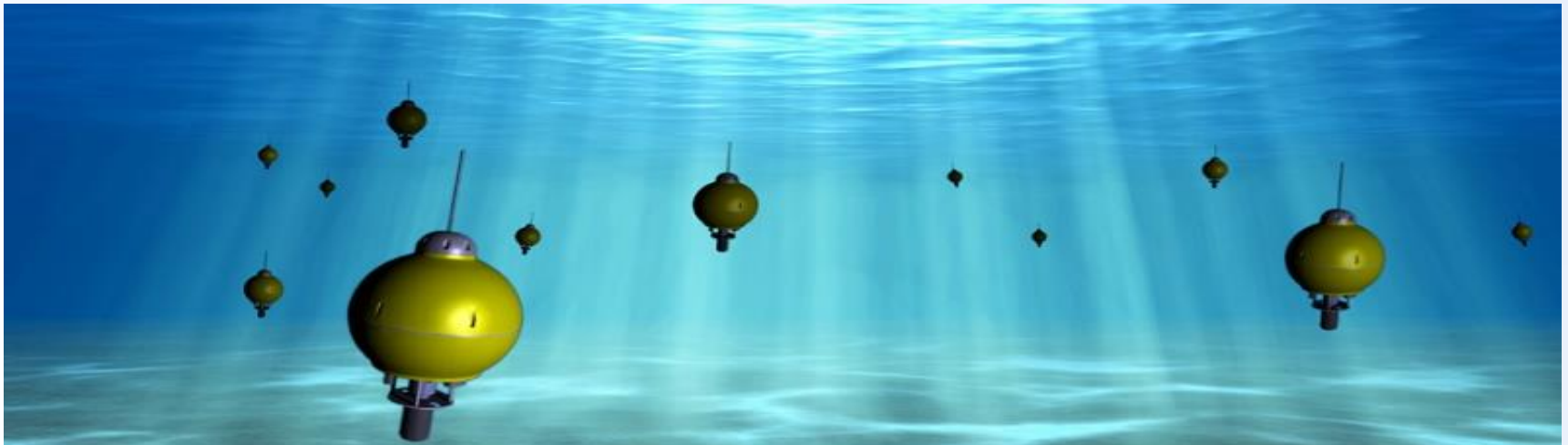


Acquisition of ocean and marine data



Economy of data acquisition

- Data are collected by governments, research institutes, and private industry (in Europe already more than 1.000 organisations)
- Data for physics, geophysics, meteorology, chemistry, biology, geology, bathymetry
- Acquisition of oceanographic and marine data is expensive; annual costs in Europe estimated at **1.4 Billion Euro** (1.0 = in-situ; 0.4 = satellites)



Professional data management is required with agreements on standardisation, quality control protocols, long term archiving, catalogues, and access

What is SeaDataNet?



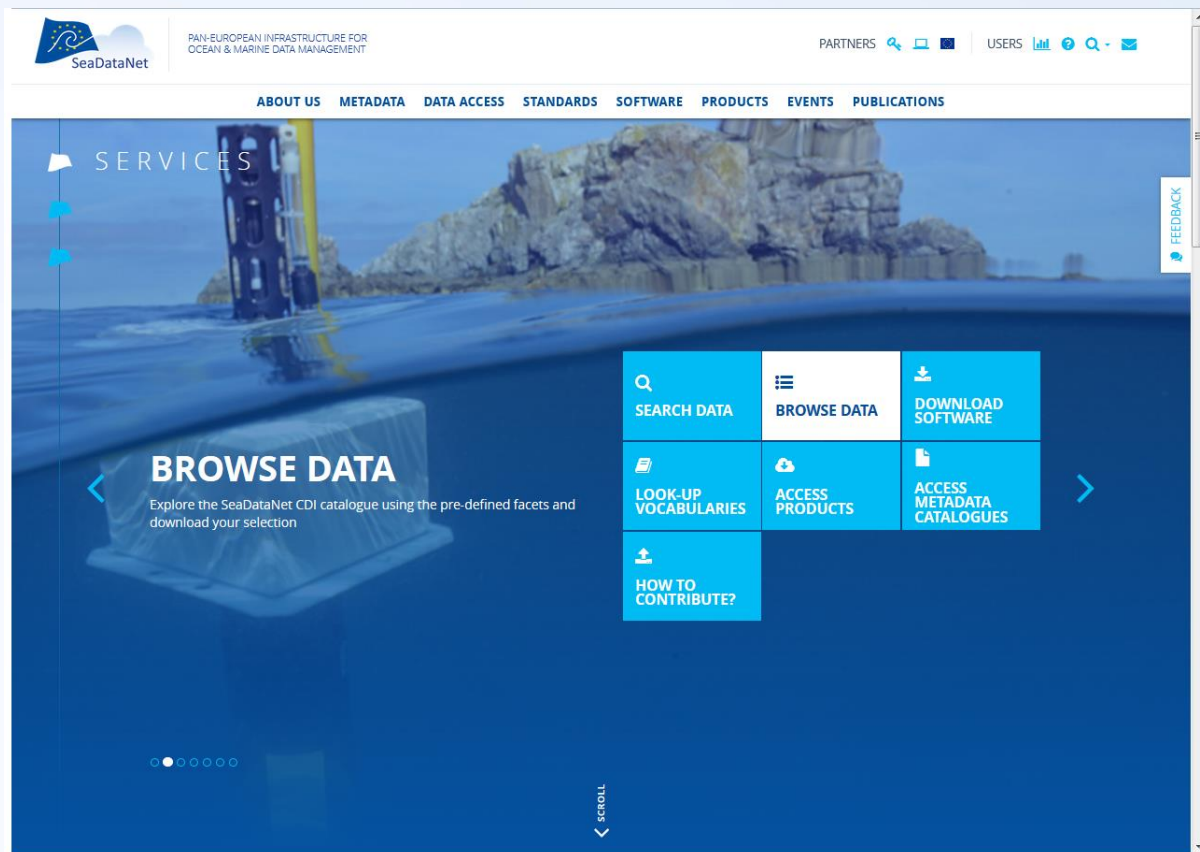
A pan-European infrastructure set up and operated for managing marine and ocean data in cooperation with the NODCs and data focal points of 34 countries bordering the European seas

90s	Metadata directories Medar/MedAtlas
2002-2005	Sea-Search (FP5)
2006-2011	SeaDataNet (FP6)
2011-2015	SeaDataNet II (FP7)
2016-2020	SeaDataCloud (H2020)

SeaDataNet portal

Giving access to

- Standards, tools both for data centres and other users
- Data and metadata
- Products



<http://www.seadatanet.org>

SeaDataNet standards

- Set of common standards for the marine domain, adapting ISO and OGC standards and achieving INSPIRE compliance
 - **Adoption of ISO 19115 – 19139 standard for describing metadata** on data sets, research cruises, monitoring networks, and research projects => marine metadata profiles, schemas, schematron rules
 - **Controlled vocabularies** for the marine domain (>65,000 terms in 82 lists), with international governance and web services
 - **Standard data exchange formats** : ODV ASCII and NetCDF (CF) fully supported by controlled vocabularies
- Maintenance and dissemination of standard QA-QC procedures, together with IOC/IODE and ICES

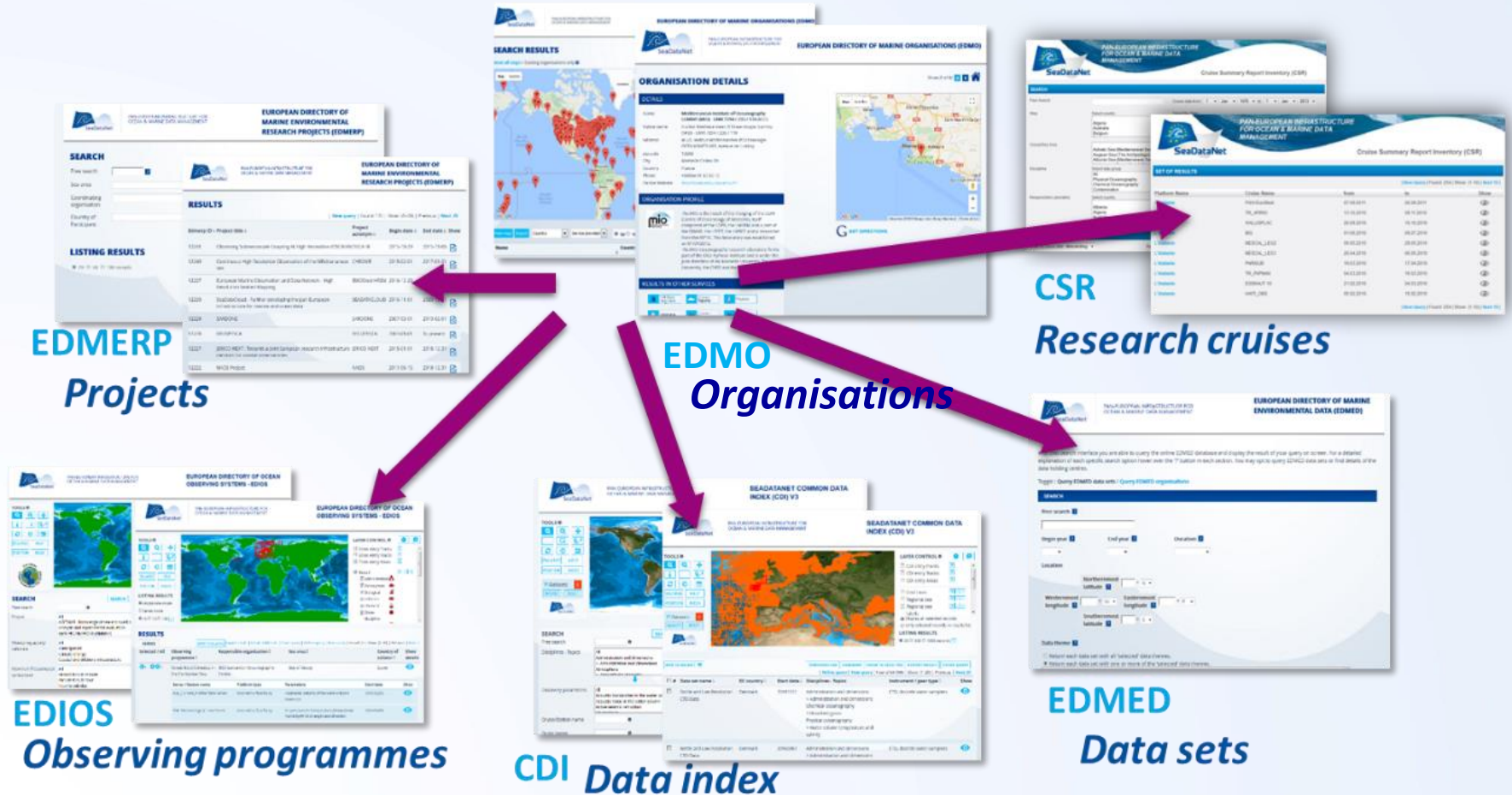


SeaDataNet services and tools

- **Set of tools** to be used each data centre and freely available from the SeaDataNet portal: metadata editor, data conversion software, data analysis software (ODV), data interpolation software (DIVA)
- **Capacity building** by training workshops for uptake of standards and tools by the data centres in order to achieve standardisation
- **Pan-European services** for harmonised discovery, access, visualisation of data and data products
- **Common SeaDataNet Data Policy** and License

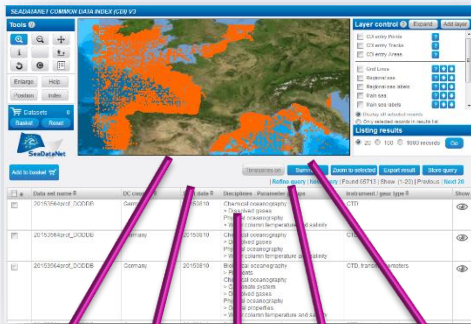


Pan-European metadata directories

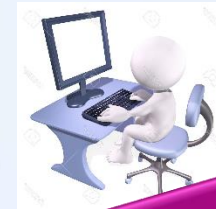


CDI Data Discovery and Access service

SeaDataNet portal



Search and Shop

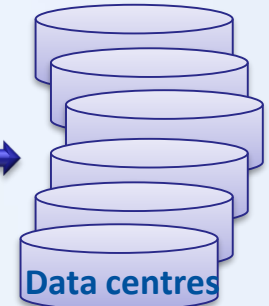


Data

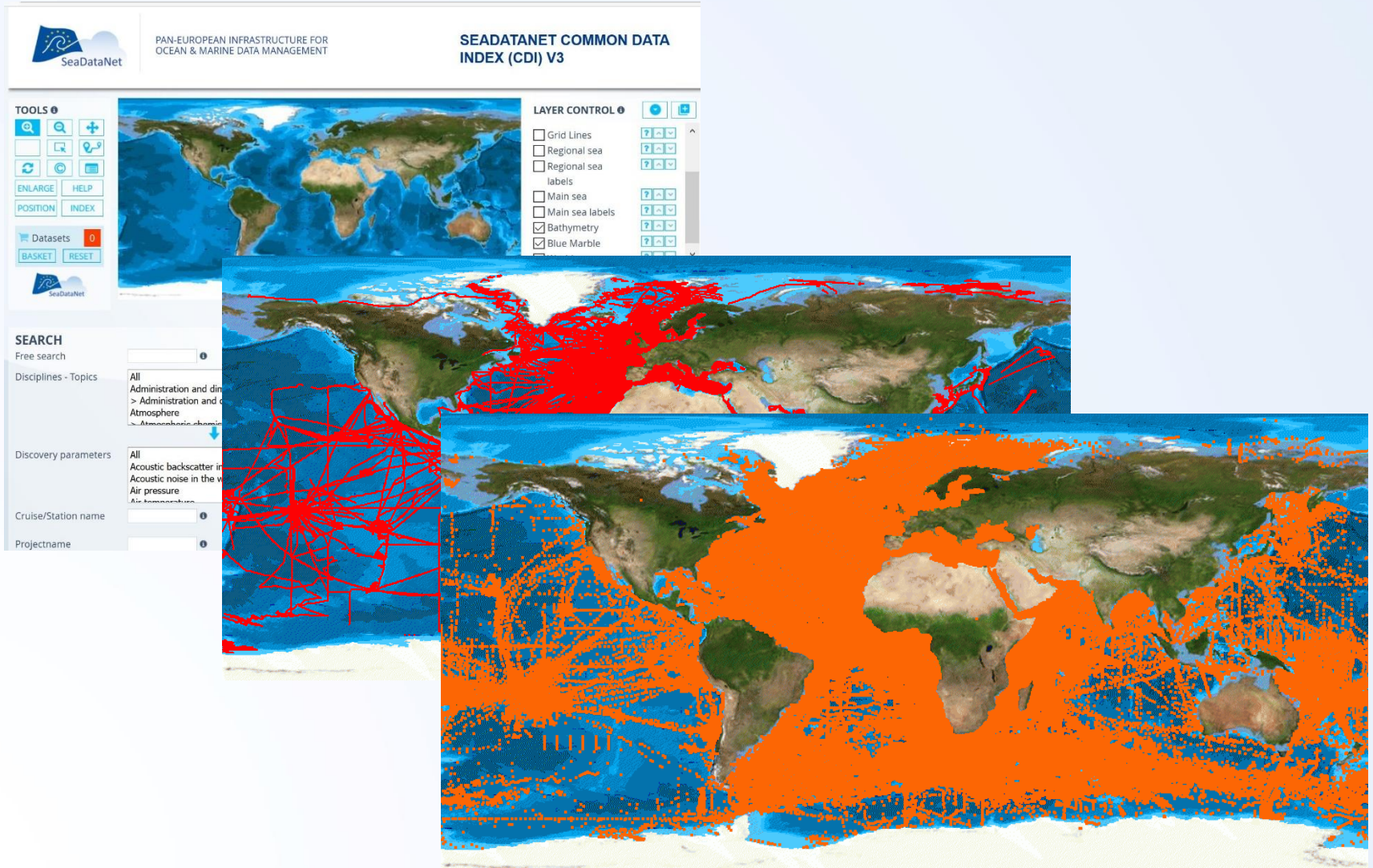
Already 110 data centres connected and more underway



Metadata + transaction data



European data sources data centres ← ≈ 650 originators



The screenshot displays the SEADATANET COMMON DATA INDEX (CDI) V3 web interface. At the top left is the SeaDataNet logo and the text "PAN-EUROPEAN INFRASTRUCTURE FOR OCEAN & MARINE DATA MANAGEMENT". The main title is "SEADATANET COMMON DATA INDEX (CDI) V3".

TOOLS

- ENLARGE
- HELP
- POSITION
- INDEX
- Datasets: 0
- BASKET
- RESET

SEARCH

Free search:

Disciplines - Topics: All, Administration and d... > Administration and d... Atmosphere, Atmospheric obs...

Discovery parameters: All, Acoustic backscatter in..., Acoustic noise in the v..., Air pressure, Air temperature...

Cruise/Station name:

Projectname:

LAYER CONTROL

- Grid Lines
- Regional sea
- Regional sea labels
- Main sea
- Main sea labels
- Bathymetry
- Blue Marble

The interface features three map views: a top world map, a middle map with red lines representing cruise tracks, and a bottom map with orange dots representing data points. The bottom map is partially obscured by a large orange semi-transparent rectangle.

SeaDataNet as driver and contributing to many portals

Total collection



Data discovery
And access



> 110 data centres



NODCs; HOs; GEOs; BIOS; ICES;

> 650 European data
originators



GEOSS portal



IODE ODP portal

Aggregated collection



Black Sea portal



Caspian portal

Regional subsets



Geo-Seas portal

Thematic subsets

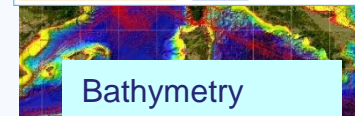
Thematic subsets

Thematic subsets

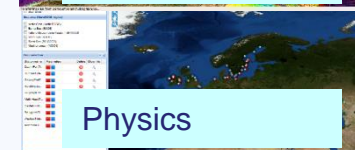
Thematic subsets

Thematic subsets

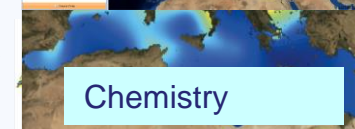
Thematic subsets



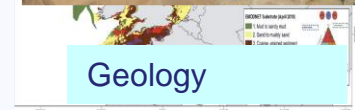
Bathymetry



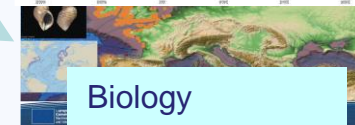
Physics



Chemistry



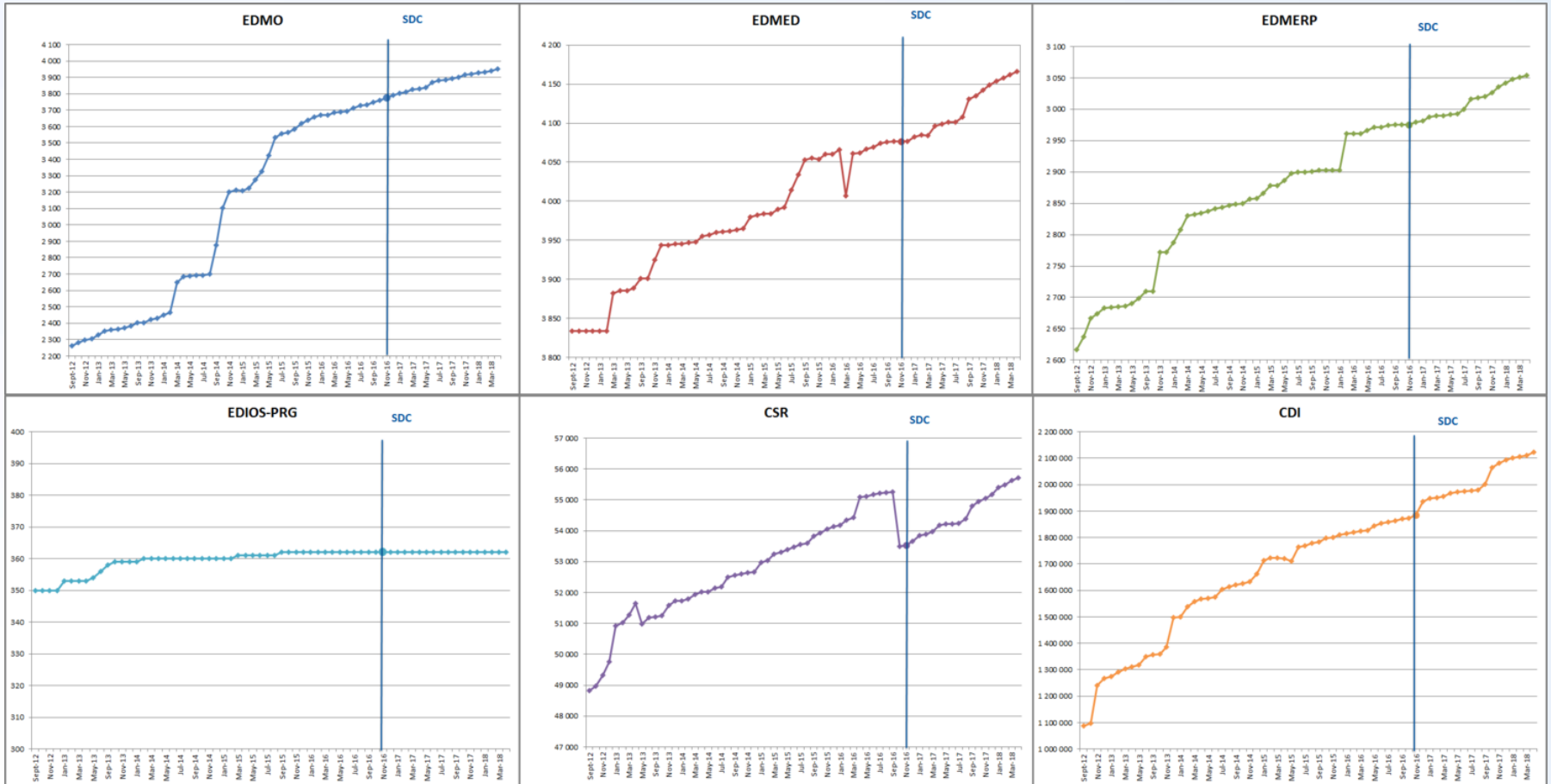
Geology



Biology

**CDI Data Discovery
and Access service**

SeaDataNet directories increase



Data Products and viewers

Home > Products

DATA PRODUCTS

DESCRIPTIONS & DOCUMENTATION

SeaDataNet provides aggregated datasets (ODV collections of all SeaDataNet measurements of temperature and salinity by sea basins) and climatologies (regional gridded field products based on the aggregated datasets) for all the European sea basins.

Search ...

CATALOG MY DOWNLOADS

Results 1 to 17 on 17 : 20 by page - Sort by: Popularity -

- North Atlantic Ocean - Temperature and salinity observation coll...
- Mediterranean Sea - Temperature and Salinity Climatology V1.1

SeaDataNet Temperature and Salinity historical data collection, including quality flags after quality control with ODV. For access please register at <http://www.marine-geo.org>

Source: Seadatanet

Black Sea - Temperature and salinity observation collection V2

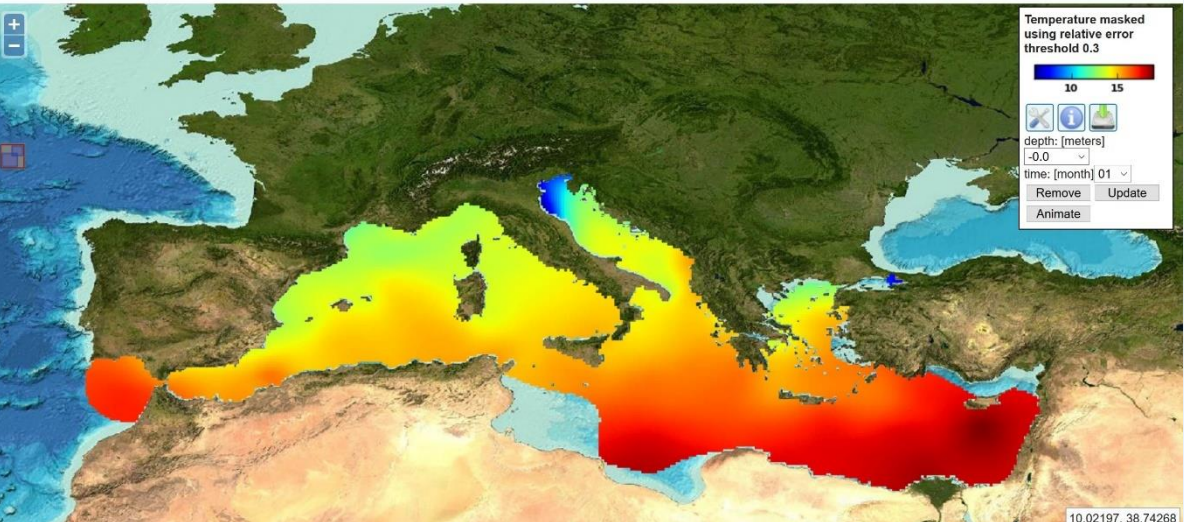
The Black Sea historical dataset includes all access temperature and salinity in situ data from the Black Sea and Sea of Marmara for the period 1868-2014. The data were retrieved from the Black Sea Data Collection (BSDC) project.

Source: Seadatanet

SeaDataNet products
Viewing and Downloading service

Horizontal Section Vertical Section

Select data products Report a problem About Help



Temperature masked using relative error threshold 0.3

10 15

depth: [meters] [-0.0]

time: [month] 01

Remove Update Animate

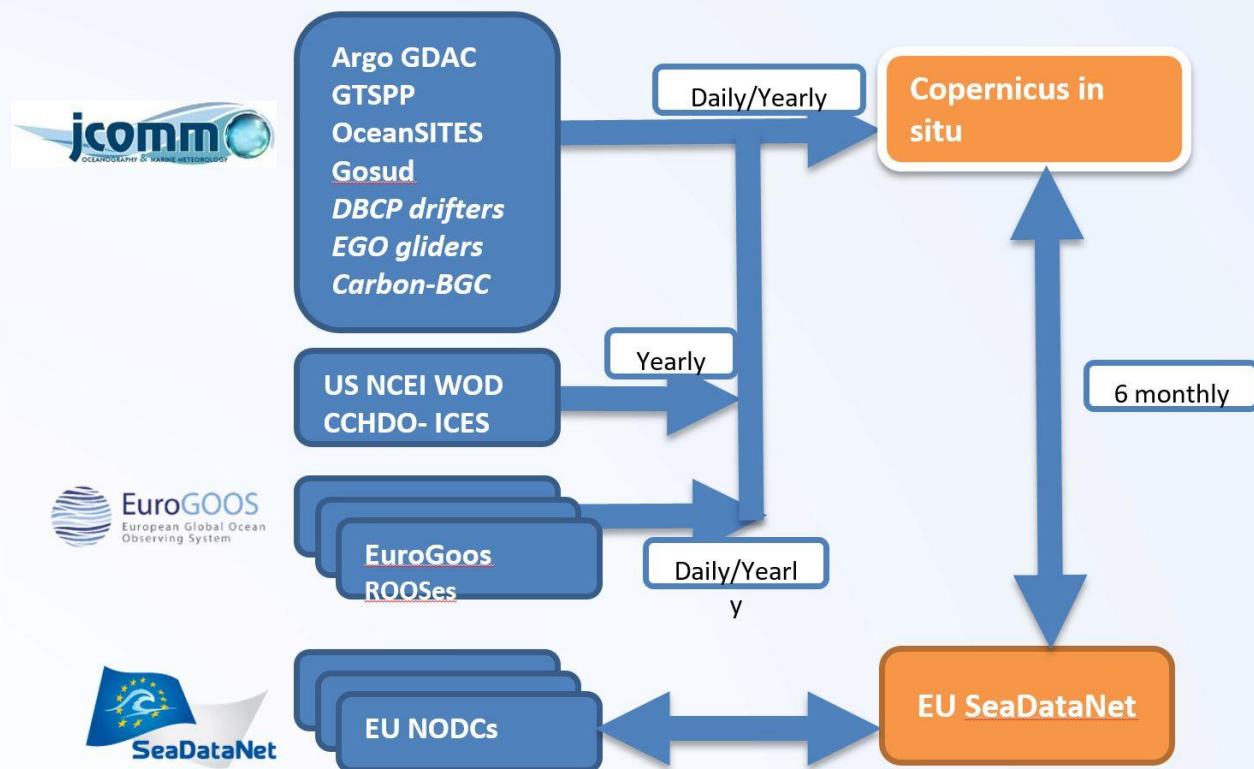
10.02197, 38.74268



SeaDataNet cooperation

- **Marine Strategy Framework Directive (MSFD):** providing infrastructure, standards and data collections for several indicators
- **Large ocean monitoring systems (EuroGOOS, AtlantOS, Euro-ARGO, JERICO-Next, ..):** providing standards and validation + long-term archiving services
- **GEOSS - EuroGEOSS:** Maintaining the GEOSS portal with SeaDataNet in-situ data collections from large community of European data holders
- **Copernicus:** Data exchange with Copernicus Marine Environmental Monitoring Services (CMEMS) and providing standards:

Copernicus Marine Environmental Monitoring Services (CMEMS)



SeaDataNet providing long-term archives and standards



Ocean Data Interoperability Platform (ODIP - ODIP II)

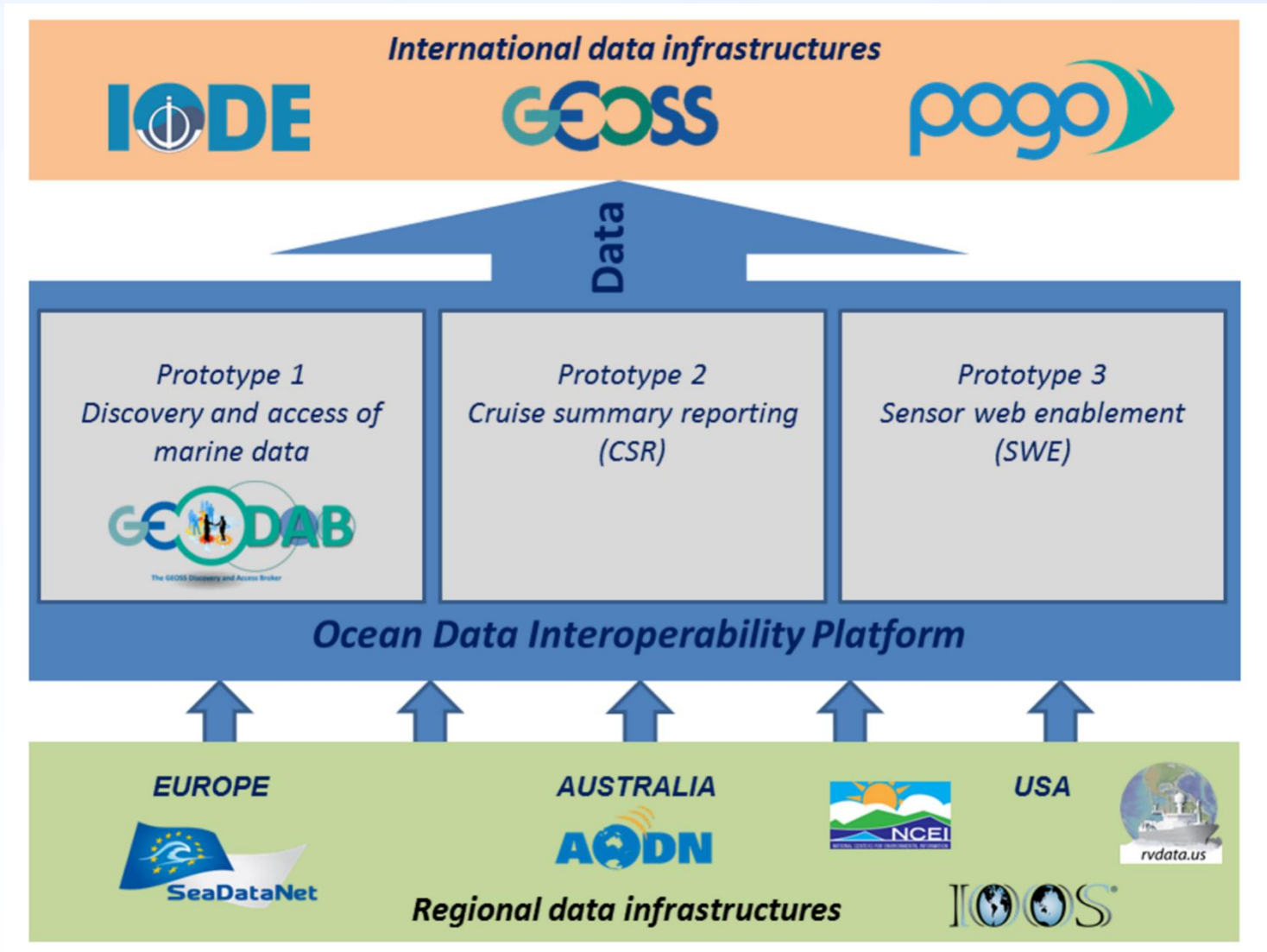
- European-USA-Australia collaborative project
- Supported by:
 - European Commission
 - National Science Foundation (NSF)
 - Australian Government
- Promoting the development of a common global framework for marine data management by developing interoperability between existing regional e-infrastructures of Europe, USA and Australia and towards global infrastructures such as GEOSS, IOC-IODE and POGO.
- In practice by organising international workshops with leading experts to present, compare and discuss approaches and standards applied.
- Developing prototypes for interoperability solutions or common standards to overcome identified differences. Prototypes projects are worked out in order to evaluate and test solutions.



Australian Government



ODIP – Prototype projects





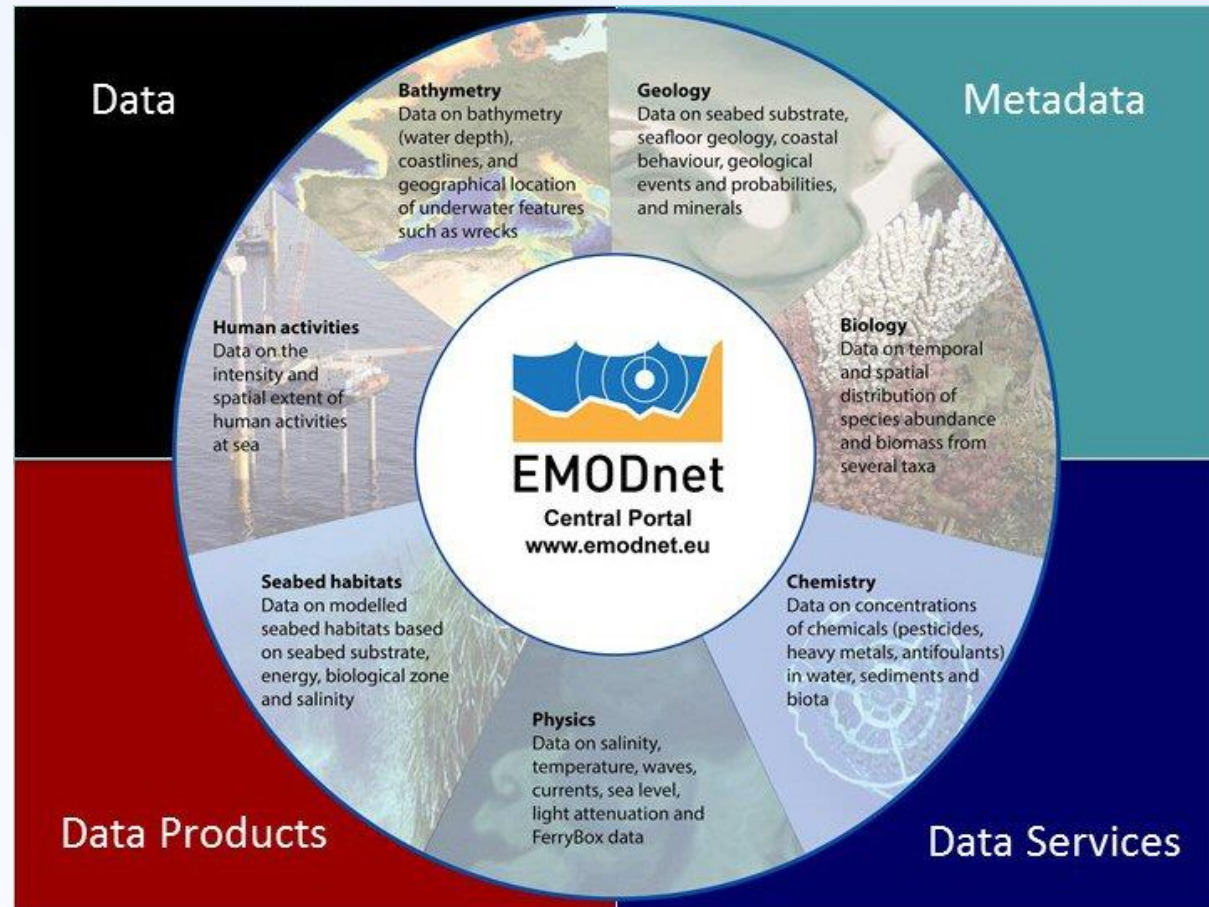
SeaDataNet and EMODnet

- EU initiative for an overarching **European Marine Observation and Data Network (EMODNet)** driven by Marine Knowledge 2020 and Blue Growth
- SeaDataNet qualified as a leading infrastructure for the EMODnet data management component and is driving several thematic portals from the start in 2008
- *‘Bottom-up meets top-down’*
- This synergy has resulted in many more data centres adopting SeaDataNet standards and connecting to the CDI Data Discovery and Access service while it gave a flying start to EMODnet

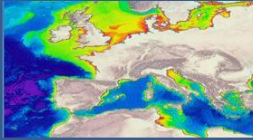

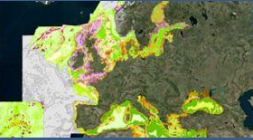
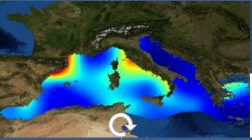
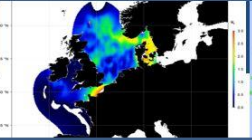





European Marine Observation and Data Network

- Central portal
- Thematic portals for physics, biology, geology, bathymetry, chemistry, seabed habitats and human activities
- Checkpoints for analysing fitness for purpose




EMODnet thematic portals

Bathymetry	Geology	Seabed Habitats	Chemistry	Biology	Physics	Human activities
						
<p>Minimum cell water depth</p> <p>Maximum cell water depth</p> <p>Average cell water depth</p> <p>Standard deviation of cell water depth</p> <p>Number of values used for interpolation of cell water depth</p> <p>Horizontal coordinate reference system</p> <p>Depth reference system</p> <p>Lowest Astronomical Tide</p>	<p>Seabed substrate</p> <p>Sediment accumulation rate</p> <p>Sea-floor geology</p> <p>Seabed lithology</p> <p>Stratigraphy</p> <p>Coastline migration</p> <p>Aggregate resources</p> <p>Geological events</p>	<p>Data on modelled seabed habitats (depth, seabed substrate, broad scale biological zone, T, S, light, oxygen, energy due to waves & current)</p> <p>Broad-scale physical habitat map</p> <p>Detailed habitat maps from surveys</p> <p>Individual habitat modelling outputs</p> <p>Habitat point data</p>	<p>Pesticides & Biocides</p> <p>Antifoulants</p> <p>Pharmaceuticals</p> <p>Heavy Metals</p> <p>Hydrocarbons</p> <p>Radionuclides</p> <p>Fertilizers</p> <p>Acidity</p> <p>Dissolved Gasses</p> <p>Plastics</p> <p>Marine Litter Beach litter Seafloor litter Micro litter</p> <p>Chlorophyll Silicates Organic Matter</p>	<p>Biomass</p> <p>Abundance</p> <p>Gridded Abundance maps</p> <p>species groups:</p> <ul style="list-style-type: none"> • phytoplankton • zooplankton • angiosperms • macro-algae • invertebrate bottom fauna • birds • mammals • reptiles • Fish 	<p>Waves</p> <p>Water temperature</p> <p>Water salinity/conductivity/density</p> <p>Currents</p> <p>Light attenuation/fluorescence</p> <p>Sea level</p> <p>Atmospheric parameters</p> <p>Wind</p> <p>Underwater noise</p> <p>Rivers</p> <p>Ice</p>	<p>Aggregate Extraction Dredging</p> <p>Fisheries</p> <p>Hydrocarbon Extraction Main Ports</p> <p>Mariculture</p> <p>Ocean Energy Facilities</p> <p>Pipelines and Cables</p> <p>Protected Areas</p> <p>Waste Disposal</p> <p>Wind Farms</p> <p>Other Forms of Area Management / Designation</p>



The screenshot shows the EMODnet Bathymetry portal homepage. At the top left is the EMODnet logo, which consists of a stylized blue and yellow wave icon above the text 'EMODnet'. To the right of the logo is the word 'BATHYMETRY' in a large, bold, blue font, followed by the tagline 'Understanding the topography of the European seas' in a smaller, italicized font. In the top right corner, there is a search bar with the text 'Free search' and a magnifying glass icon, and two buttons labeled 'CONTACT' and 'SUBMIT DATA'. Below the header is a dark blue navigation bar with white text links: 'APPROACH', 'METADATA & DATA', 'DATA PRODUCTS', 'NEWS', 'PROMOTION', 'PARTNERS', and 'HELPDESK'. The main content area features a large blue background image of a yellow autonomous underwater vehicle (AUV) operating on the surface of the sea. Overlaid on this image is the text '© HCMR' and 'Developing and providing a harmonised Digital Terrain Model (DTM) for the European sea regions'. Below this main image are three white boxes with blue borders, each containing a title, a description, and a 'READ MORE' button. The first box is titled 'SURVEY DATA SETS' and describes 'CDI Data Discovery and Access service'. The second box is titled 'EMODnet DTM' and describes 'Bathymetry Viewing and Download service'. The third box is titled 'COMPOSITE DTM' and describes 'Sextant Catalogue service'. Each box also features a small image: a magnifying glass for the first, a map of Europe for the second, and a globe for the third.

EMODnet | **BATHYMETRY**
Understanding the topography of the European seas

Free search 

[CONTACT](#) [SUBMIT DATA](#)

[APPROACH](#) [METADATA & DATA](#) [DATA PRODUCTS](#) [NEWS](#) [PROMOTION](#) [PARTNERS](#) [HELPDESK](#)

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Developing and providing a harmonised Digital Terrain Model (DTM) for the European sea regions

SURVEY DATA SETS
CDI Data Discovery and Access service
[READ MORE](#)

EMODnet DTM
Bathymetry Viewing and Download service
[READ MORE](#)


COMPOSITE DTM
Sextant Catalogue service
[READ MORE](#)



Bathymetry CDI data discovery and access service



BATHYMETRY
Understanding the topography of the European seas
CDI Data Discovery and Access Service

[Results](#) | Found 27066 | Show 26501 | [Previous](#) | [Next](#)

 Dataset(s) 0 [Proceed to basket](#) [Reset basket](#)

[XML](#)  

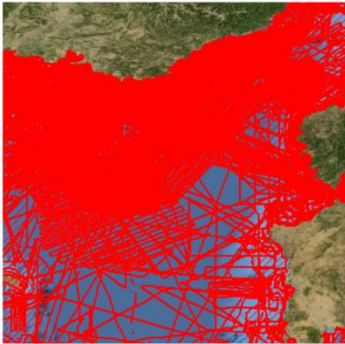
[Reset all steps](#)

Layer control ▼ +



- CDI entry Points ?
- CDI entry Tracks ?
- CDI entry Areas ?
- Coastlines [] [] []
- Mean depth full coverage with land coverage [] [] []
- Grid Lines ? [] [] []
- Regional sea ? [] [] []
- Regional sea labels ? [] [] []
- Bathymetry ? [] [] []

Display all selected records
 Only selected records in results list

[Zoom to selected](#)



Search by:

- [Geographical Box](#) 
- [Time period](#) 
- Measuring area type**
- surface (25232)
- curve (1829)
- point (5)
- Parameter categories**
- Gravity, magnetics and bat... (27066)
- Terrestrial (27066)
- Field geophysics (1829)

ADD TO BASKET 20 100 1000 Records

- # Data set name
- S196900100-016
- S196900100-014

Details

WHAT?

Data set name: TIR96

Discipline: Marine geology, Terrestrial

Parameter groups: Gravity, magnetics and bathymetry, Terrestrial

Discovery parameters: Bathymetry and Elevation

GEMET-INSPIRE themes: Oceanographic geographical features

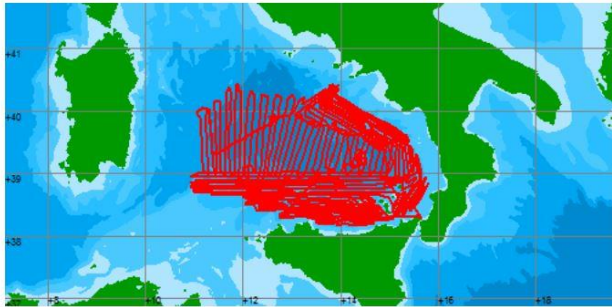
Abstract: The data have been acquired with a Simrad EM120 S Multi Beam echosounder aboard the Russian R/V Gelendzhik in order to survey the Tyrrhenian sea for geological and seafloor mapping in the framework of an Italian project funded by CNR and APAT (Geological Survey Agency). Sea state was rough at times. Results, maps can be found in the book: Marani M. P., Gamberi F., Bonatti E. (2004). Editors: From seafloor to deep mantle: architecture of the Tyrrhenian backarc basin. Memorie Descrittive Della Carta Geologica d'Italia, (pp. 1-194).

Data format: Climate and Forecast NetCDF **Version 3.5**

Data set creation date: 20170831

WHERE?

Map



GML id: mc01

GML objects

Name	Description
Track T960016 for TIR96	Track T960016 for TIR96
Track T960017 for TIR96	Track T960017 for TIR96

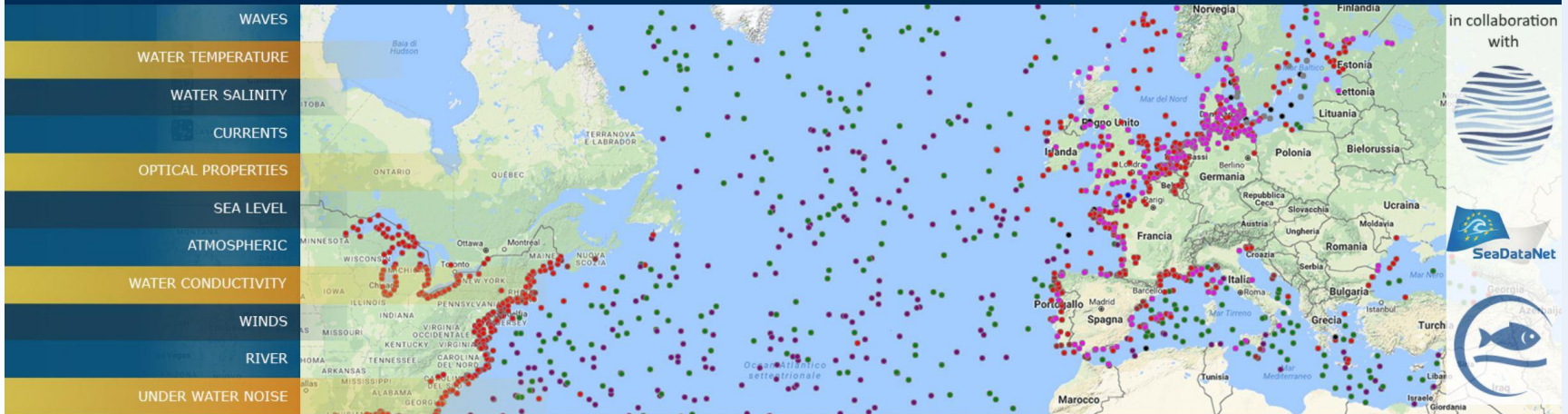


PHYSICS

Oceans Physics at your fingertips

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- [MAP VIEWER](#)
- [CATALOGUE](#)
- [ABOUT](#)
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- [SUBMIT DATA](#)
- [CENTRAL PORTAL](#)



DATA
INGESTION

[PRODUCTS](#)

[THERDDS](#)

[ERDDAP](#)

[GEOSERVER](#)

[API REST SOAP](#)

[WMS WFS](#)

[DASHBOARD](#)

[GITHUB](#)

[VIDEOS](#)



Pillars under EMODnet Physics



The European Global Ocean Observing System, association and its regional components (ROOSs)



Copernicus Marine Environment Monitoring System (CMEMS)



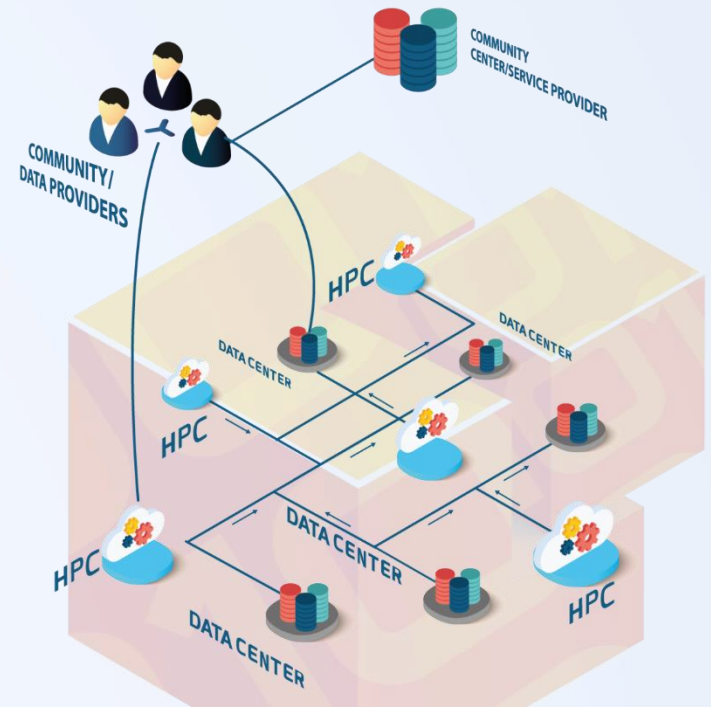
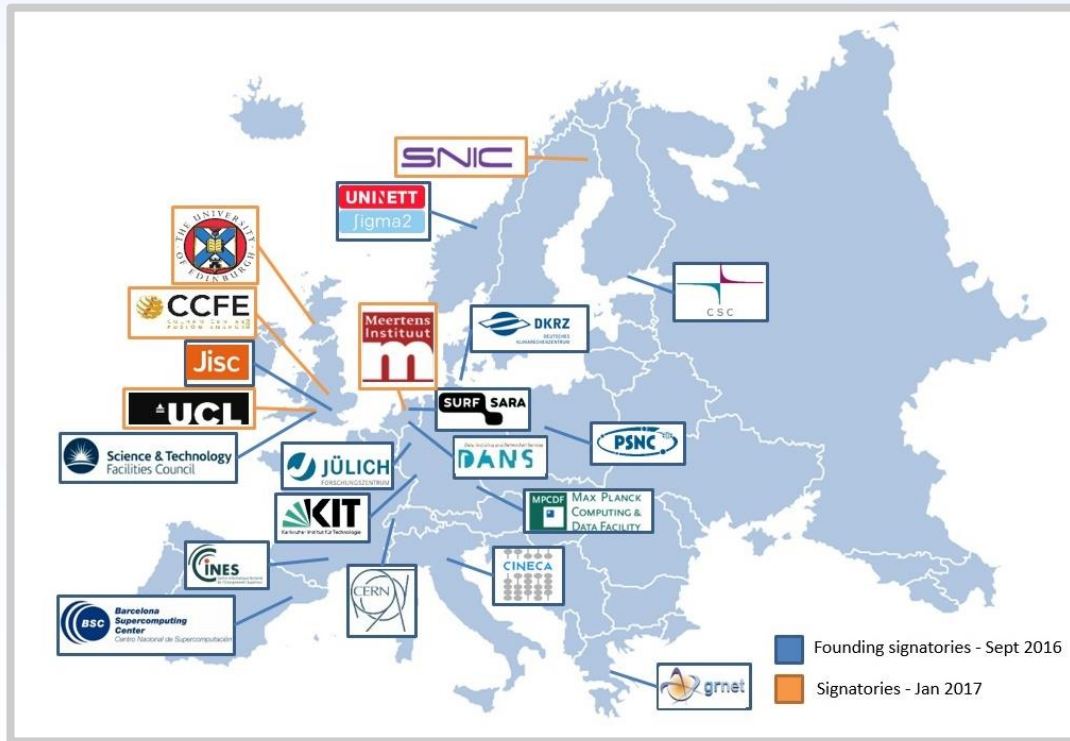
SeaDataNet, pan-European marine data management infrastructure and network of NODCs



SeaDataCloud a new opportunity

- Standards and information technology are always evolving, there is a move towards cloud storage and cloud computing, and the SeaDataNet infrastructure must stay up-to-date to maintain and further expand its services to its leads customers and major stakeholders
- SeaDataCloud project, started Nov 2016 with 4 year run and 10 Meuro funding
- A strategic and operational cooperation between the SeaDataNet consortium of marine and ocean data centres and the EUDAT consortium of e-infrastructure service providers

Cooperation with EUDAT



EUDAT is European consortium of academic computing centres

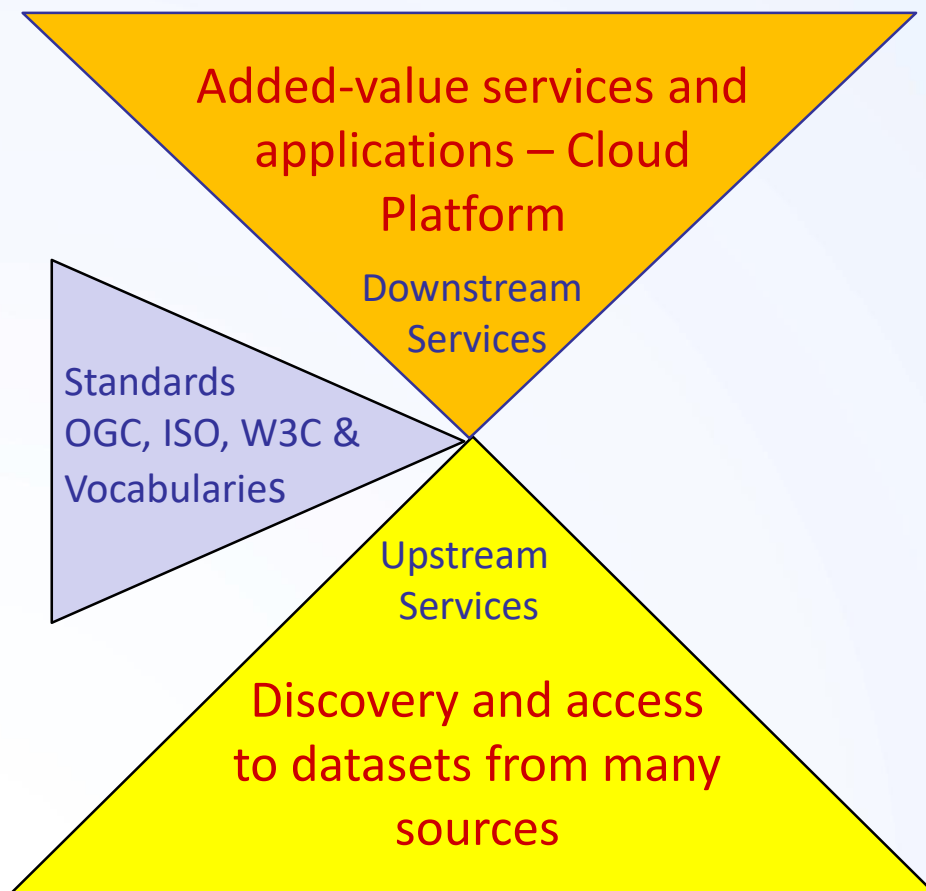


What is it about?

- SDC is about **updating and further developing standards**
- SDC is about improving and innovating services & products
- SDC is about adopting and elaborating new technologies
- SDC is about giving more attention to users and putting the user experience in a central position

- SDC is also about developing a **Virtual Research Environment (VRE)** bringing data and applications together in the cloud and serving users

Towards a Blue Cloud as blue print for the European Open Science Cloud (EOSC)



- Cloud platform with common services for data pre-processing, analyses, visualizations, publishing, DOIs...
- Applying common standards and interoperability solutions for providing harmonised data and metadata
- Providing harmonised discovery and access to data output from multiple sources, European and international

EMODnet Ingestion – wake up your data



EMODnet DATA INGESTION PORTAL
Wake up your data - set them free for Blue Society

Search CONTACT

ABOUT DATA SUBMISSION OPERATIONAL DATA SUBMISSIONS GUIDELINES DATA WANTED HELP PROMOTION CENTRAL PORTAL

Home

Welcome to the EMODnet Data Ingestion portal

The European Marine Observation and Data Network (EMODnet) consists of more than 160 organisations that together work on assembling, harmonising and making marine data, products and metadata more available to public and private users. This Data Ingestion portal facilitates additional data managers to ingest their marine datasets for further processing, publishing as open data and contributing to applications for society.

[READ MORE](#)



Submit your data files

The online Data Submission service facilitates you to submit marine datasets by completing a form and



Ingest operational data

We are also interested in (Near) Real-Time ((N)RT) data streams from fixed and autonomous ocean



View submissions

View, search and download datasets that have been submitted by data providers using the Data



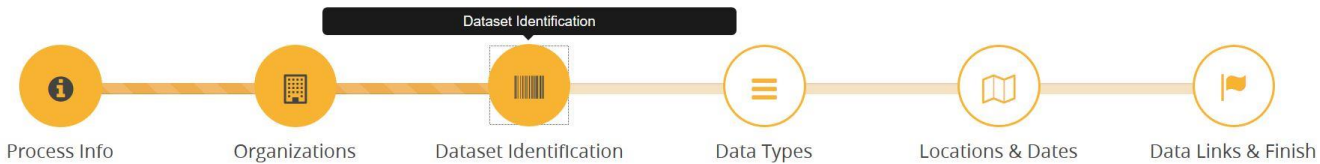
SeaDataCloud

Submission service for offline data sets

**EMODnet**
DATA INGESTION PORTAL
Wake up your data - set them free for Blue Society
Data Submission Service

[DASHBOARD](#) | [BACK TO LIST](#)

WELCOME DICK M.A. SCHAAP (M) | [LOGOUT](#)



Dataset Identification

* = Required


DATASET GENERAL INFORMATION

Title of dataset * ⓘ 2011-GEMS, Zone 8 - Bristol Channel Atlantic Array, Metocean assessment

Narrative summary of dataset * ⓘ GEMS Survey Ltd. (GEMS) was awarded a contract by Channel Energy Limited to undertake metocean data collection in the Bristol Channel as part of the Atlantic Array wind farm development project. The scope of work includes the deployment of two acoustic wave and current (AWAC) units and one Directional Waverider Buoy. Ancillary work includes water and sediment sampling and water profiling. Following non-recovery of AWAC devices, TRIAXYS Directional Wave buoys were utilised for the rest of the survey. This series contains both reports and datasets associated with the Metocean Assessment.

DATASET FORMATS

Dataset format * ⓘ Text or Plaintext


DATA INGESTION PORTAL
Wake up your data - set them free for Blue Society

CONTACT

ABOUT
DATA SUBMISSION
GUIDELINES
SUBMISSIONS
DATA WANTED
HELP
OPERATIONAL DATA
PROMOTION
CENTRAL PORTAL

Home / Submissions

View submissions

This service allows users to search and download the datasets that have been submitted via the Submission service and that have been reviewed and completed in metadata by assigned data centers. These datasets are published "as-is" and will be further inspected and elaborated, where possible, for uptake in the national and European infrastructures supporting EMODnet.

Search by

Free search

 Q

Date [yyyymmdd]

 Q

Geobox

RESET

SEND


Sea areas

- Strait of Sicily (3)
- Black Sea (2)
- Skagerrak (2)
- Baltic Sea (1)
- North Atlantic Ocean (1)

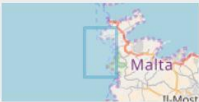
Observation types

Results (10)

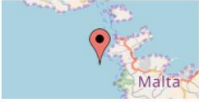
southstream observation
 Period: 2014-10-18 - 2015-10-15
 Observation type: Currents,Other physical oceanographic measurements,Water column temperature and salinity



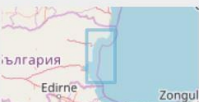
CTD Cumnija Bay
 Period: 1996-09-17 - 1996-09-22
 Observation type: Dissolved gases,Other inorganic chemical measurements,Water column temperature and salinity




Currents Cumnija Bay
 Period: 1996-05-29 - 1996-09-30
 Observation type: Currents



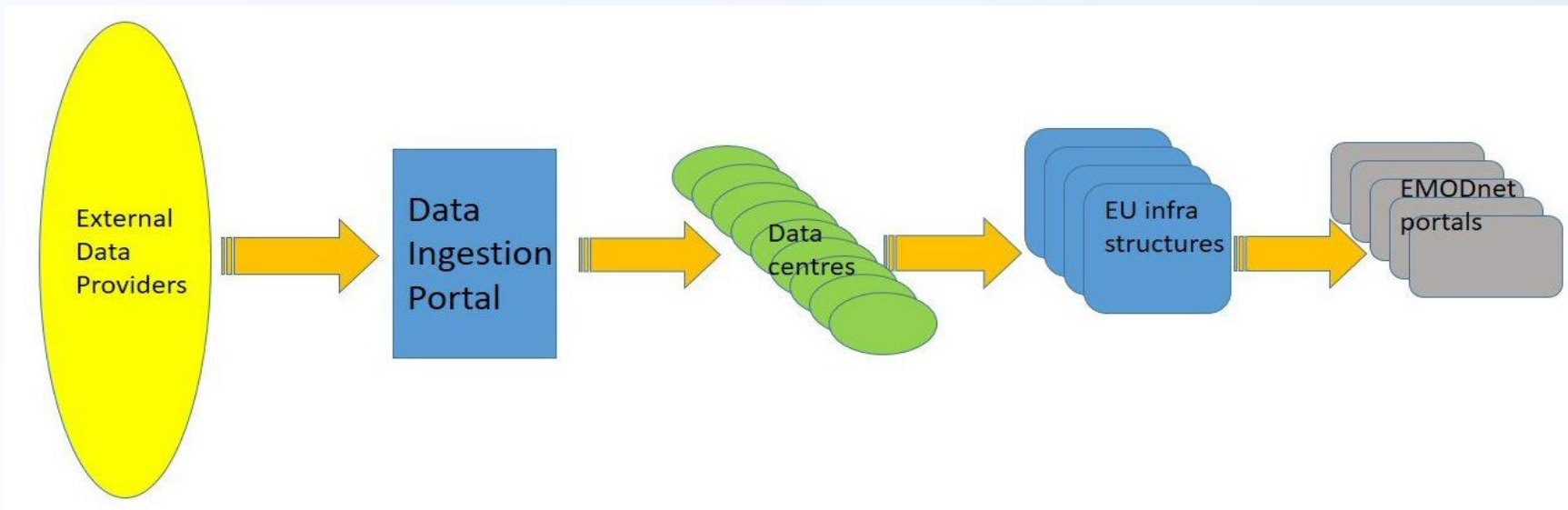
Ferry box data
 Period: 2015-04-01 - 2015-10-31
 Observation type: Water column temperature and salinity



oceanographic data from UTO platform
 Period: 2017-03-01 - 2017-07-01



Uptake of ingested data sets by European infrastructure



EMODnet Data Ingestion

WAKE UP YOUR DATA

Set them free for Blue Society

The **Data Ingestion Portal** facilitates submitting marine datasets for further processing, Open Data publishing and contributing to applications for society.

emodnet-ingestion.eu



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