



# **SeaDataNet – pan-European infrastructure for ocean and marine data management**

**By**

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**Vienna - Austria, 8 April 2013, EGU Conference**

**Supported by the European Commission**





**EU FP5**  
**EU FP6**  
**EU FP7**

**2002 - 2005**  
**2006 - 2011**  
**2011 - 2015**

SeaDataNet has set up and is operating a pan-European infrastructure for managing marine and ocean data by connecting National Oceanographic Data Centres (NODC's) and oceanographic data focal points from 35 coastal states in Europe

# SeaDataNet Main facts

- Development of common standards for the marine domain:
  - Vocabularies, Metadata formats, Transport formats
- Operation of European catalogues for marine projects, data sets, organisations, monitoring systems, cruise summary reports
- Infrastructure with at present 83 connected data centres (more underway)
- One unique portal to discover and access all data as managed by these distributed data centres
- Common SeaDataNet Data Policy and SeaDataNet License
- Set of tools to be used by each data centre
  - MIKADO: generator of XML descriptions of SeaDataNet catalogues
  - NEMO: reformatting software to SeaDataNet formats
  - Download Manager: local software to control downloading
  - ODV: Ocean data view adapted to SeaDataNet needs
  - DIVA: for product generation adapted to SeaDataNet needs
- Development and operation of additional services for visualisation and data products

# Portal with harmonised services, data products and tools for users and data centres

**SeaDataNet**

PAN-EUROPEAN INFRASTRUCTURE  
FOR OCEAN & MARINE DATA  
MANAGEMENT

[Overview](#) [Metadata](#) [Data Access](#) [Standards & Software](#) [Products](#) [Events](#) [Publications](#)

**SOFTWARE**

Interoperability is the key to distributed data management system success: it is achieved in SeaDataNet by developing standard and software +

**News**

- [New release of NEMO](#)  
Version 1.4.3 available
- [User manual](#)  
for metadata directories
- [Seadatanet at GEO Exhibition](#)  
in November 2011, Istanbul, Turkey
- [SeaDataNet article](#)  
in International Innovation magazine of December 2011
- [SeaDataNet](#)  
Project of the month

**Newsletters**

[Click here to Newsletters](#)

**EU Participant Portal**

[Click here to PP](#)

SEVENTH FRAMEWORK PROGRAMME

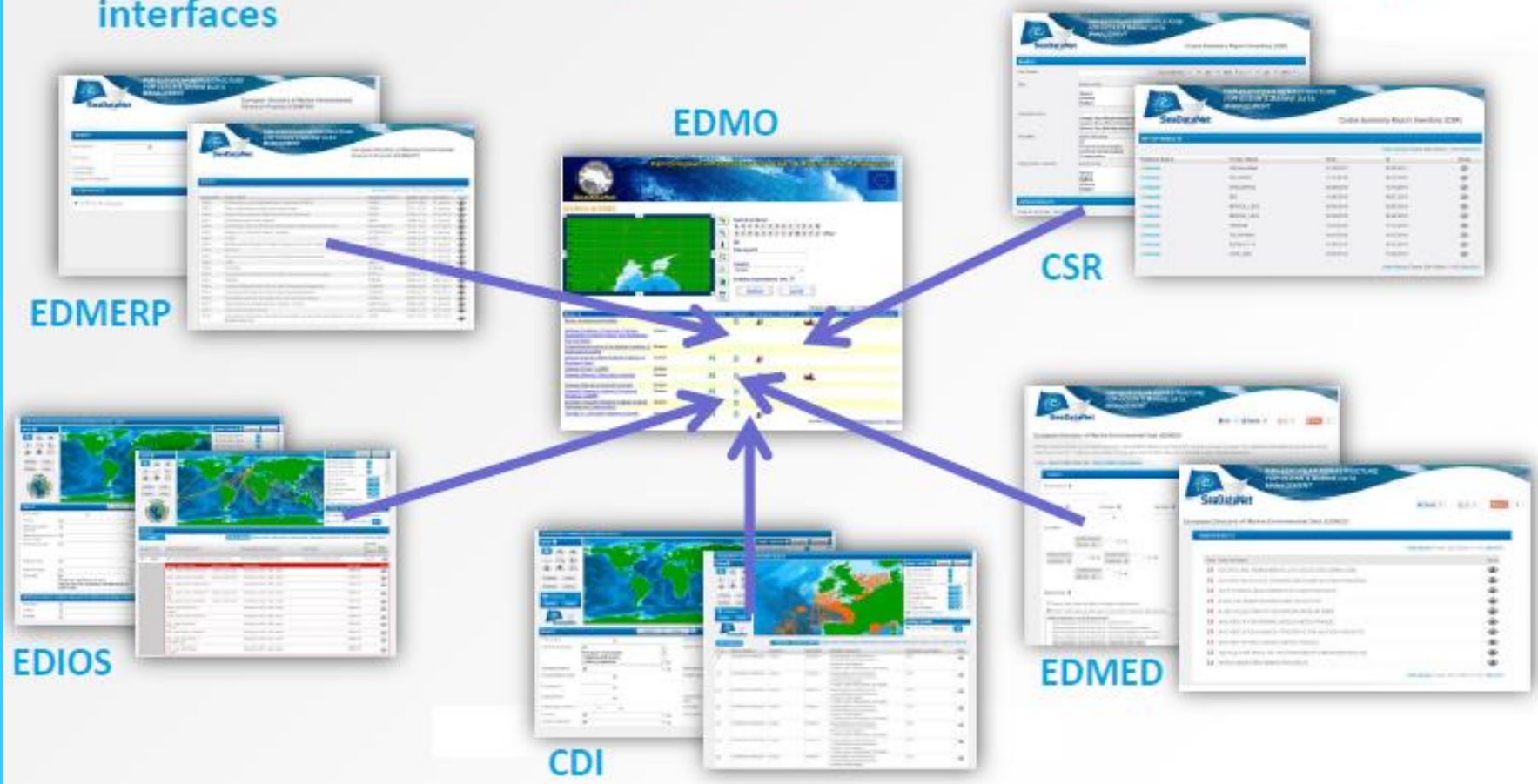
<http://www.seadatanet.org>



# Pan-European Directory Services

All SeaDataNet catalogues have been harmonised and tuned in format, syntax and semantics (common vocabularies).

They have a common editor (MIKADO) and online CMS and online query interfaces



# SeaDataNet from data discovery to unified access to analysis

SEADATANET COMMON DATA INDEX (CDI) V2

**Tools** ?

Enlarge Help  
Position Index

**Datasets** 0  
Basket Reset

**Search**

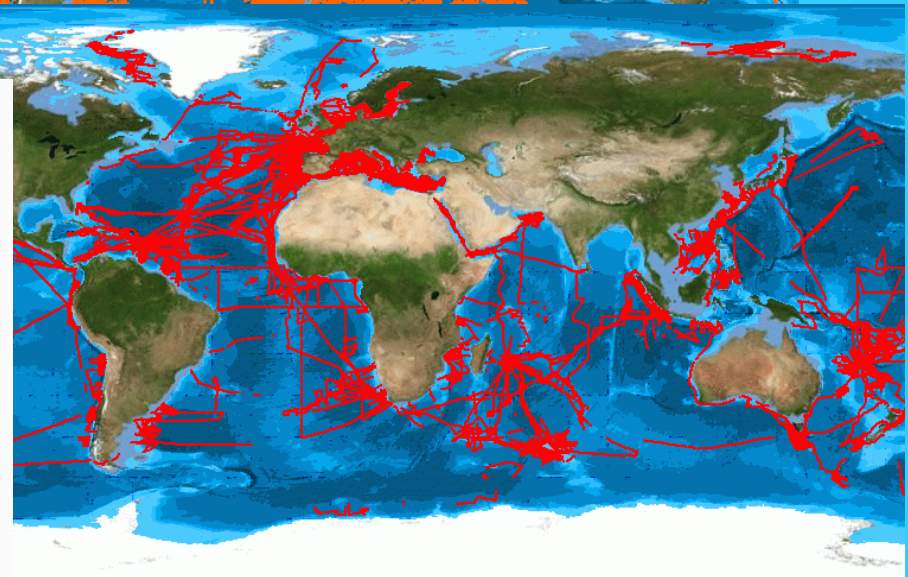
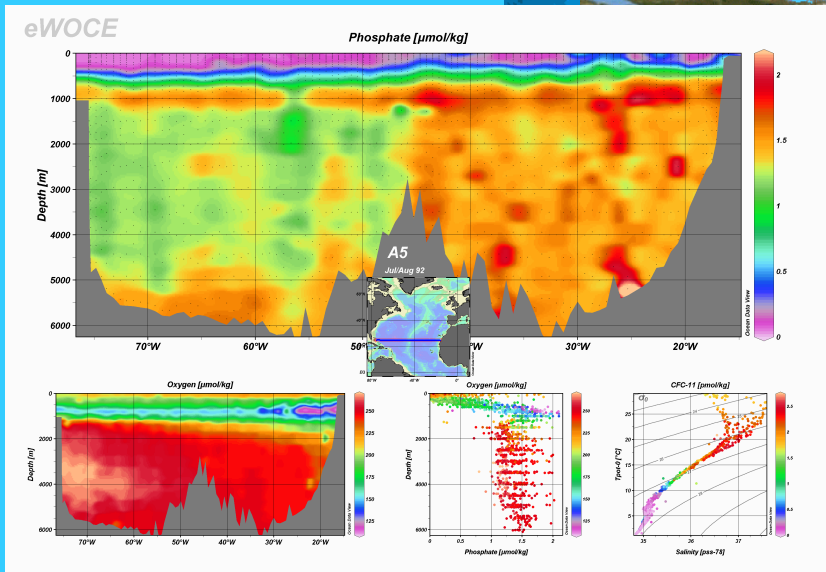
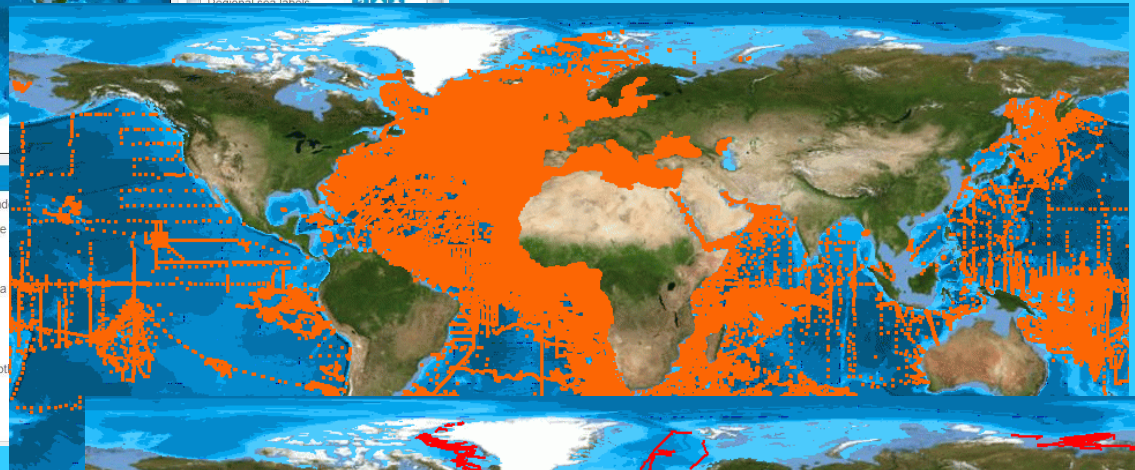
Free search  
Variable groupings  
Sampling interval  
Cruise/Station name  
Projectname  
Datasetname  
Waterdepth (m) from to  
Country

Date (yyyymmdd)  
Instrument type  
Measuring area  
Platform type  
Instrument depth from  
Originator  
CDI partner

**Layer control** ? Expand Add layer

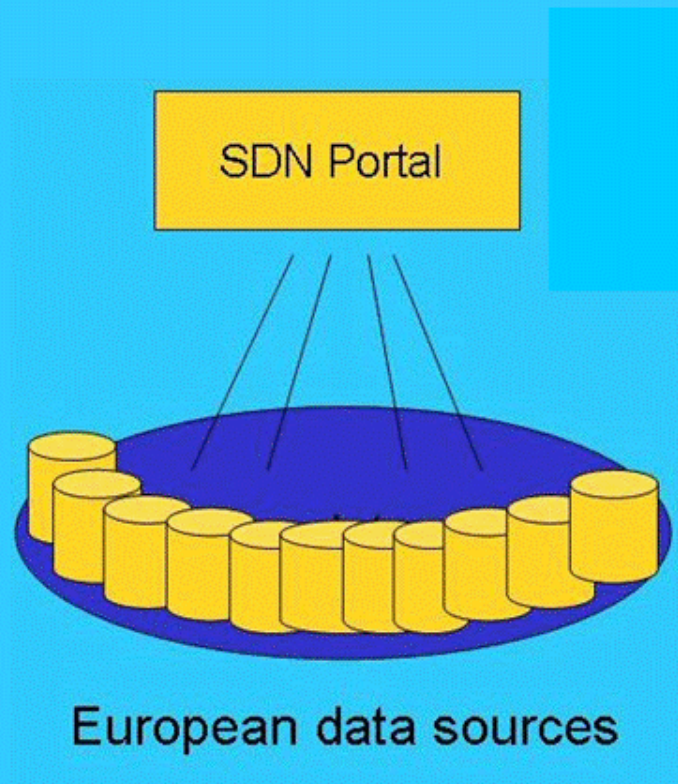
- ☐ CDI entry Points
- ☐ CDI entry Tracks
- ☐ CDI entry Areas
- ☐ Grid Lines
- ☐ Regional sea
- ☐ Regional sea labels

SeaDataNet

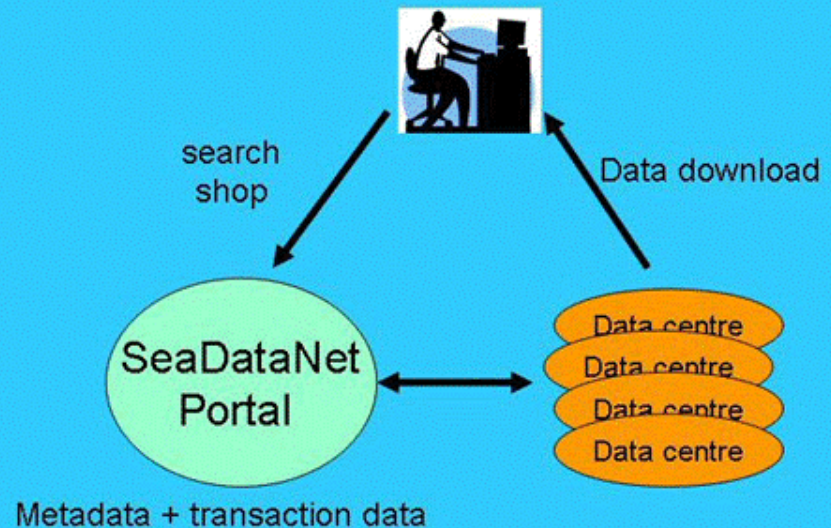




# From data discovery to unified data access and delivery



## Common Data Index (CDI) Data Discovery and Access Service



# Search

Request  
Confirmed

**Include in Basket**

## Results

## Shopping list

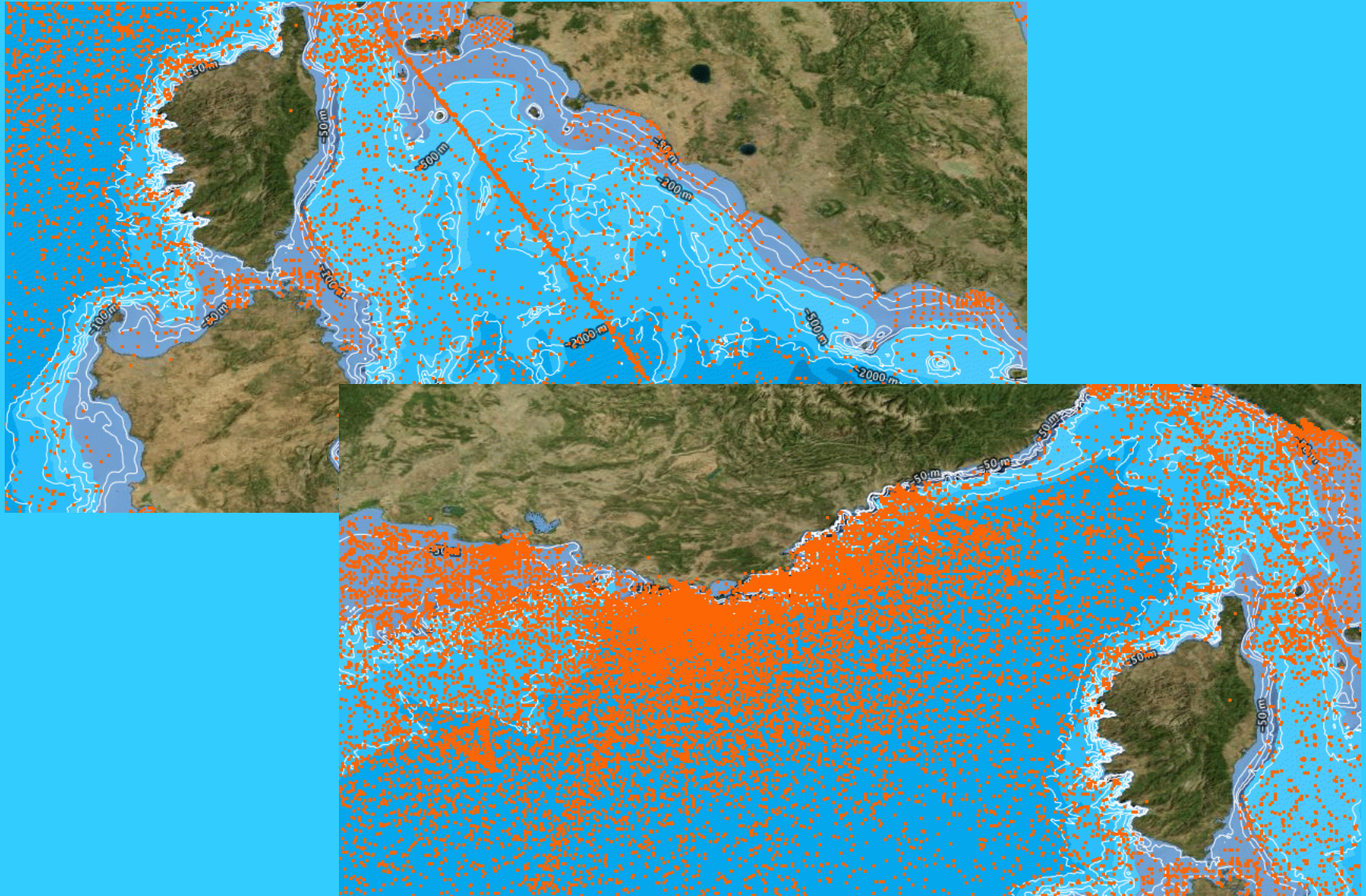
## Submit + Authentication

## Download

**Data** SDN format



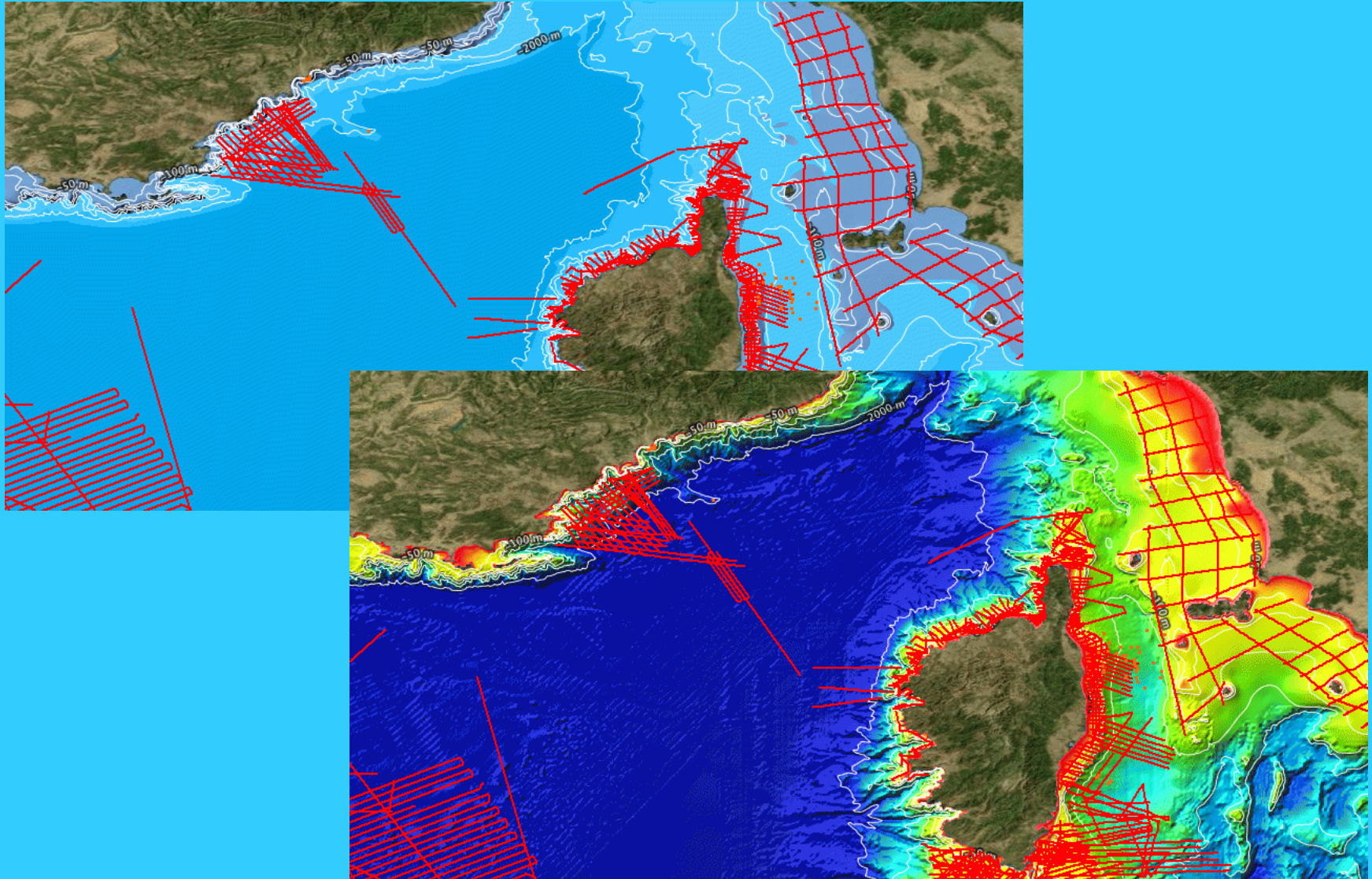
# SeaDataNet CDI Search interface



■ Searching for T&S



# SeaDataNet CDI Search interface



■ Searching for seismics (EMODNet Bathymetry as WMS layer\_

# SeaDataNet Viewing services

## ■ Ocean Data View (ODV)

- General data analysis and visualization software
- >20,000 registered users

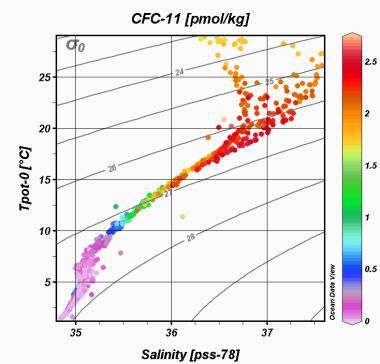
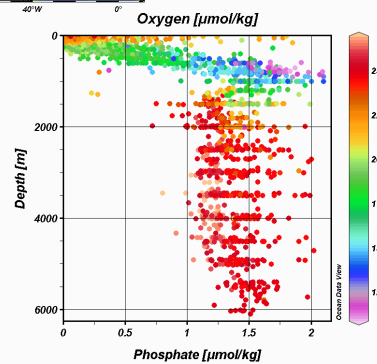
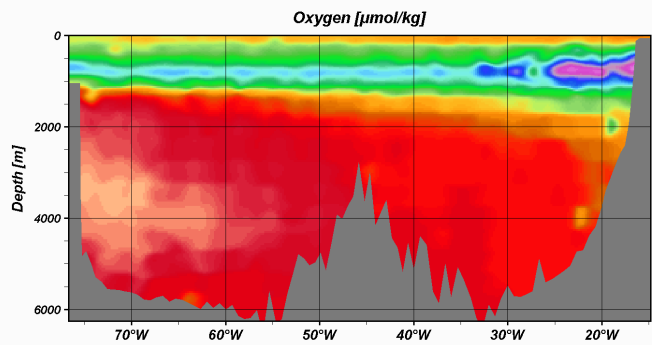
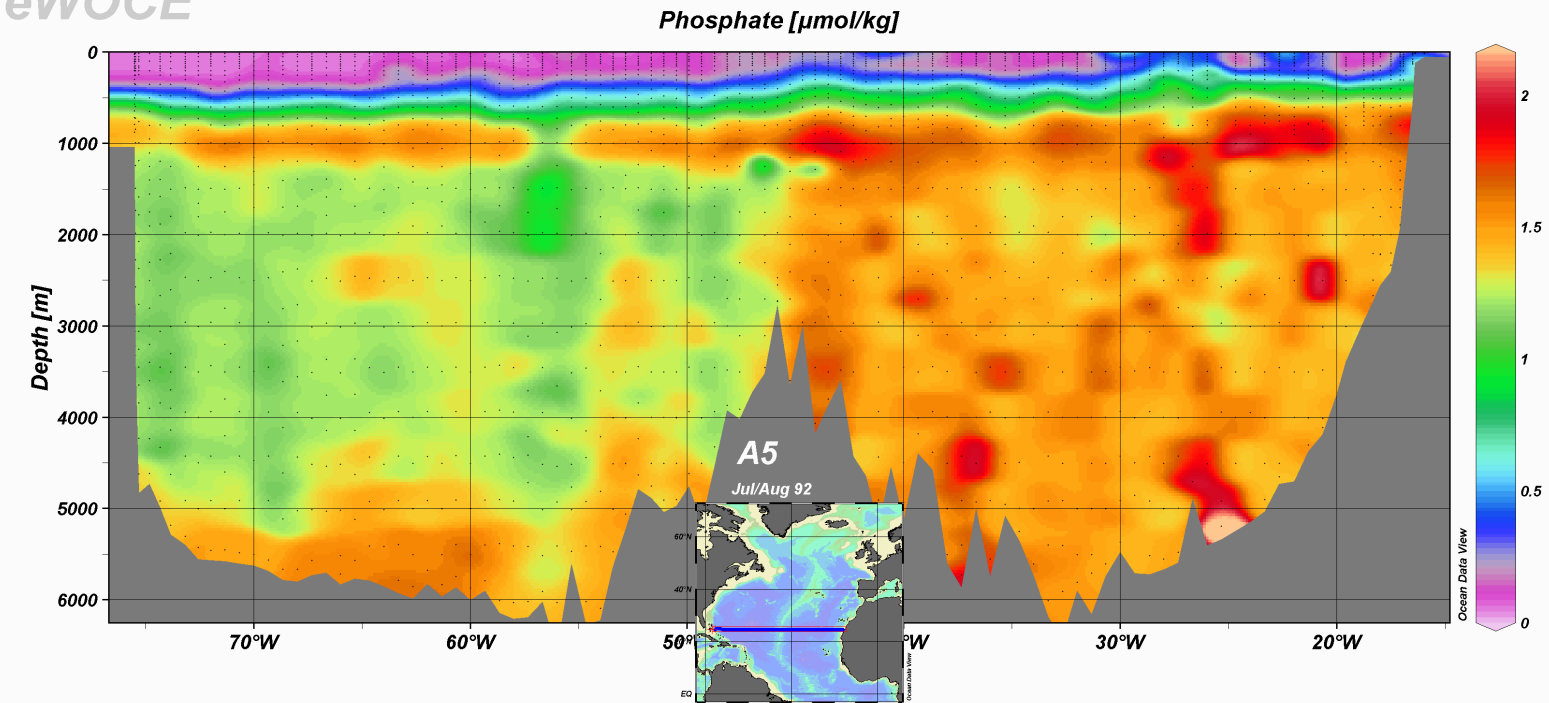
## ■ ODV software upgraded to ODV4 for:

- Extending ODV's graphical display capabilities and interactive controls for automatic and visual quality control and data quality flagging
- Seamless connection to SeaDataNet output: SDN ODV4 data formats, quality flag scale
- Integration of DIVA gridding software
- Important tool for the SeaDataNet regional Data Products

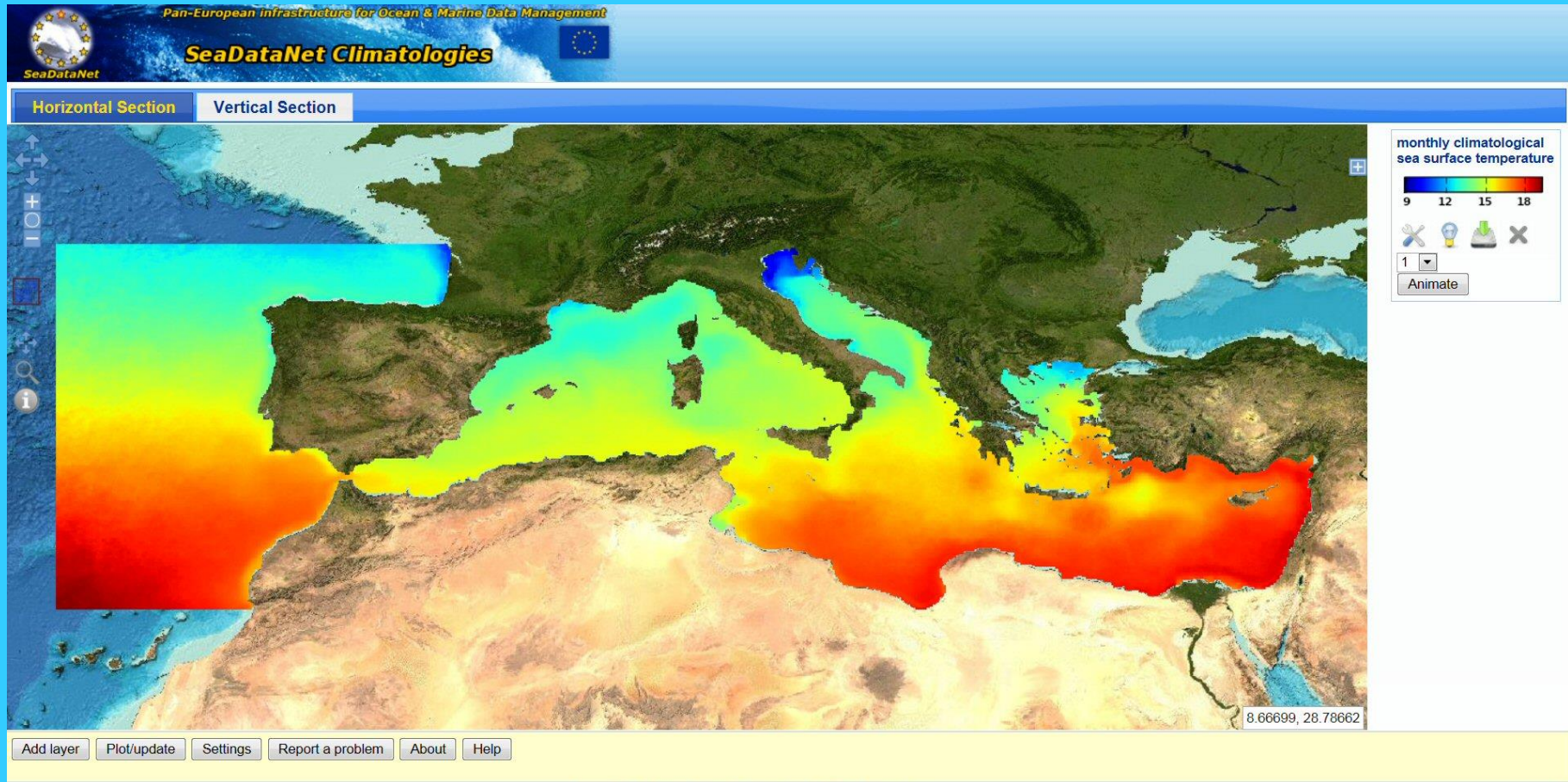
## ■ **DIVA** software (Data-Interpolating Variational Analysis) allows to spatially interpolate observations on a regular grid in an optimal way. The analysis is performed on a finite element grid allowing for a spatial variable resolution and a good representation of the coastline and isobaths.



# SeaDataNet Viewing services – ODV + DIVA



# Regional Products services



Climatologies and interpolated data products for the Arctic seas, Atlantic Ocean, Baltic sea, Mediterranean sea and the Black Sea regions. Statistical output in NetCDF files, that are visible via WMS through ***Ocean Browser***

# European Marine Observation and Data Network



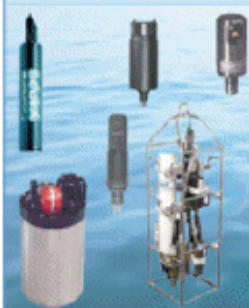
EMODnet



European Marine  
Observation and  
Data Network

## Essential Components of an Observation Network

Sensors to measure continuously and autonomously physical, chemical and biological parameters



- salinity, temperature
- turbidity, oxygen
- chlorophyll, nutrients
- pH, alkalinity
- bathymetry
- primary production

Platforms or structures anchored on the seabed, floating in the water column or drifting at the sea surface, and remote sensing from satellites.



- buoys, floats
- gliders
- mooring
- AUVs, lander
- FerryBox
- cabled networks
- remote sensing
- living Argo

Sampling and consecutive laboratory analyses from research ships, or shore, including water, sediments and biota (phytoplankton, bacteria, zooplankton, fish)



- inorganic trace compounds
- gases, e.g. CO<sub>2</sub>, CH<sub>4</sub>, DMS
- organic micropollutants
- abundance & function of biota
- food web
- HABs

Communication systems to transfer in real-time data from sensors to the network and to the land stations



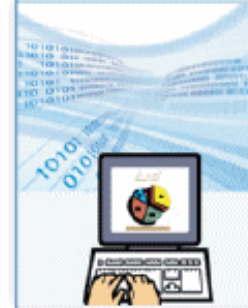
- satcom
- GSM, GPRS
- fibre optics
- acoustics

Data collection and management system for direct control of data quality, and data storage systems to enable data analysis and use for model applications



- data bases
- quality control
- data standards

Software and web based information tools to analyse data for trends, compliance to EU directives, to distribute and disseminate data to end users



- analysis
- Presentation
- web
- GIS



- SeaDataNet has qualified itself as leading infrastructure for the EMODNet data management component and is driving several preparatory EMODNet projects:
  - **Chemistry** – focus on the groups of chemicals required for monitoring the MSFD for establishing Good Environmental Status – cooperation with EEA, ICES and Regional Conventions
  - **Hydrography** – to produce and deliver a higher resolution digital bathymetry for European seas
  - **Physics** – together with MyOcean and EuroGOOS Regions to give wide access to operational metocean data, NRT and archives
- The **Geology** lot is producing harmonised seabed maps (WMS). The SeaDataNet infrastructure is adopted via the **Geo-Seas** project to give overview and access to the underlying geological and geophysical data sets.
- SeaDataNet is data partner in the **Biology** lot and a closer technical relation is being developed in the ongoing SeaDataNet II project.

**New phase of projects starting soon**

**EMODnet** European Marine Observation and Data Network

**Pilot portal for Chemistry**  
Data Discovery and Access Service

**Tools** ?

Enlarge Help  
Position Index

Datasets: 0  
Basket Reset

**Layer control** ? Expand Add layer

- ☐ Grid Lines
- ☐ Regional sea
- ☐ Regional sea labels
- ☐ Main sea
- ☐ Main sea labels
- ☒ Bathymetry
- ☒ Blue Marble
- ☒ World

☒ Display all selected records  
☐ Only selected records in results list

**Listing results**

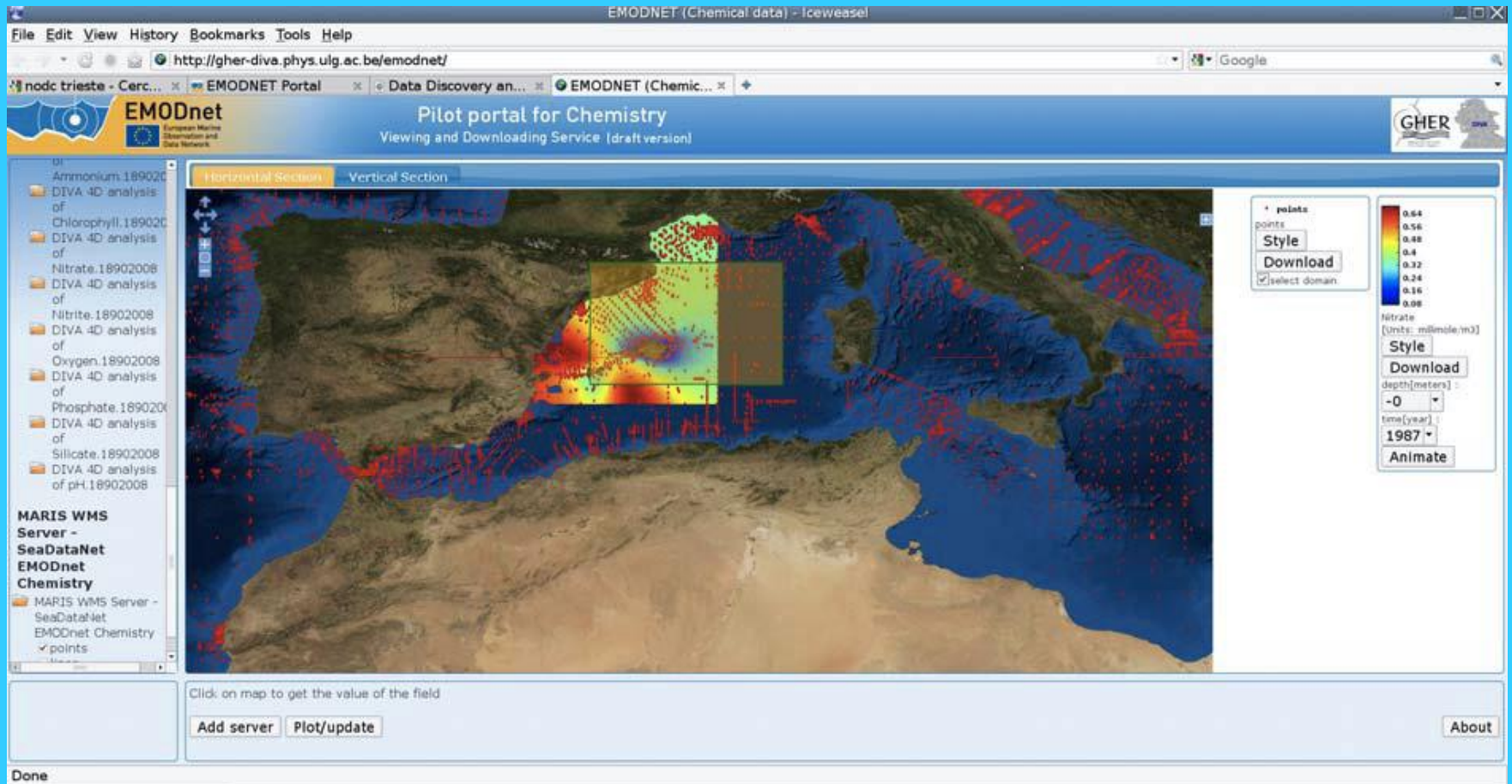
☒ 20 ☐ 50 ☐ 100 records **Go**

**Add to basket** **Summary** **Zoom to selected** [Export result](#) | [Store query](#) | [Refine query](#) | [New query](#) | Found 49783 | Show (1-20) | Previous | [Next 20](#)

#	Data set name	Country	Start date	Variables measured	Instrument / gear type	Show
<input type="checkbox"/>	CTD_Krapec1 data set	Bulgaria	20100903	Chemical oceanography > Nutrients > Carbon, nitrogen and phosphorus > Dissolved gases Physical oceanography > Water column temperature and salinity	CTD, spectrophotometers	
<input type="checkbox"/>	CTD_Sozopol data set	Bulgaria	20100904	Chemical oceanography > Nutrients > Carbon, nitrogen and phosphorus > Dissolved gases Physical oceanography > Water column temperature and salinity	CTD, spectrophotometers	
<input type="checkbox"/>	CTD_Albona data set	Bulgaria	20100903	Chemical oceanography > Nutrients > Carbon, nitrogen and phosphorus > Dissolved gases	CTD, spectrophotometers	

*CDI service with overview of chemistry data sets for the Black Sea region*

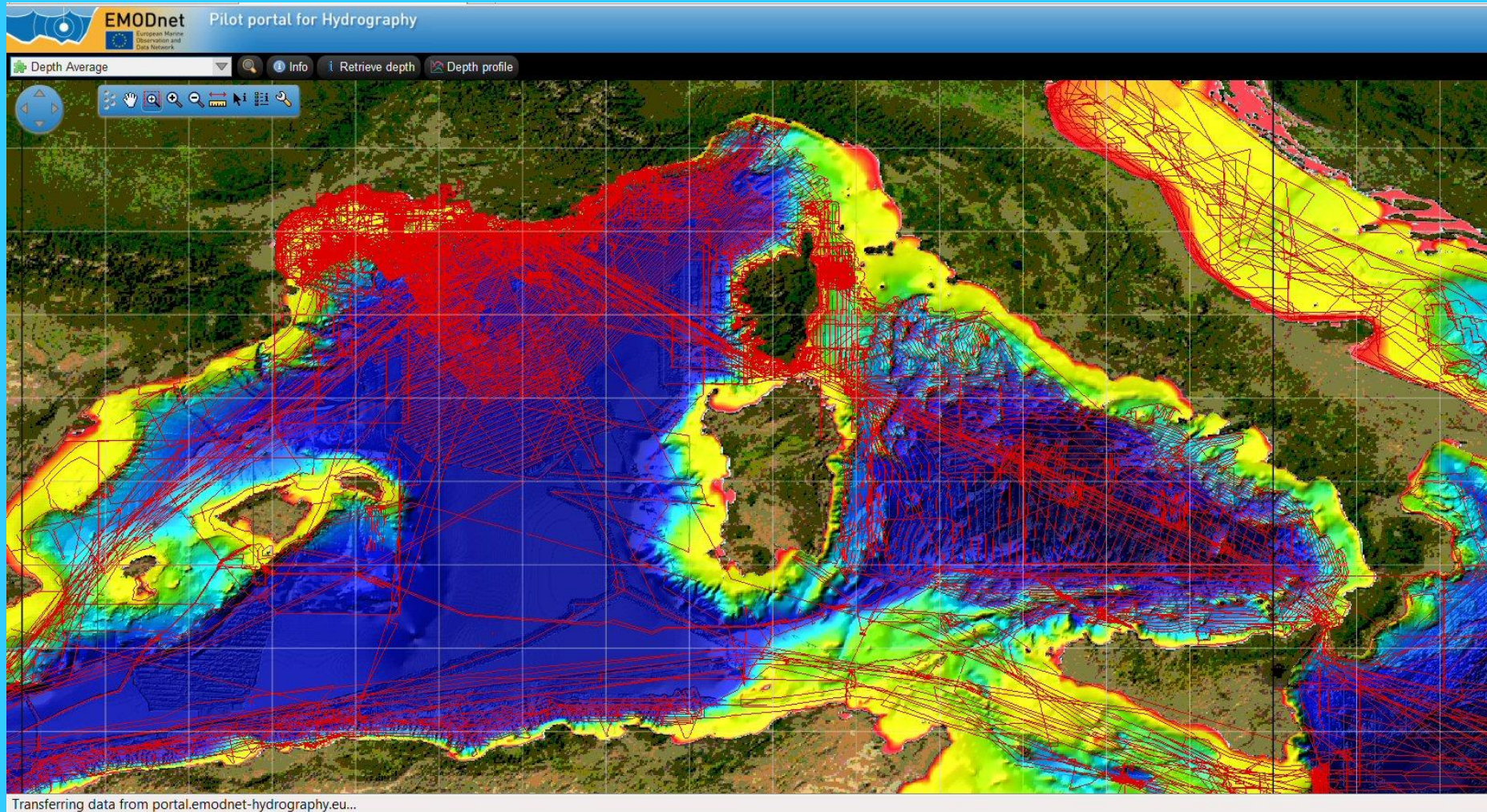
# EMODNet Chemistry



*Viewing service for Nitrate distribution in the Balearic spot  
with overlay of CDI data sets*

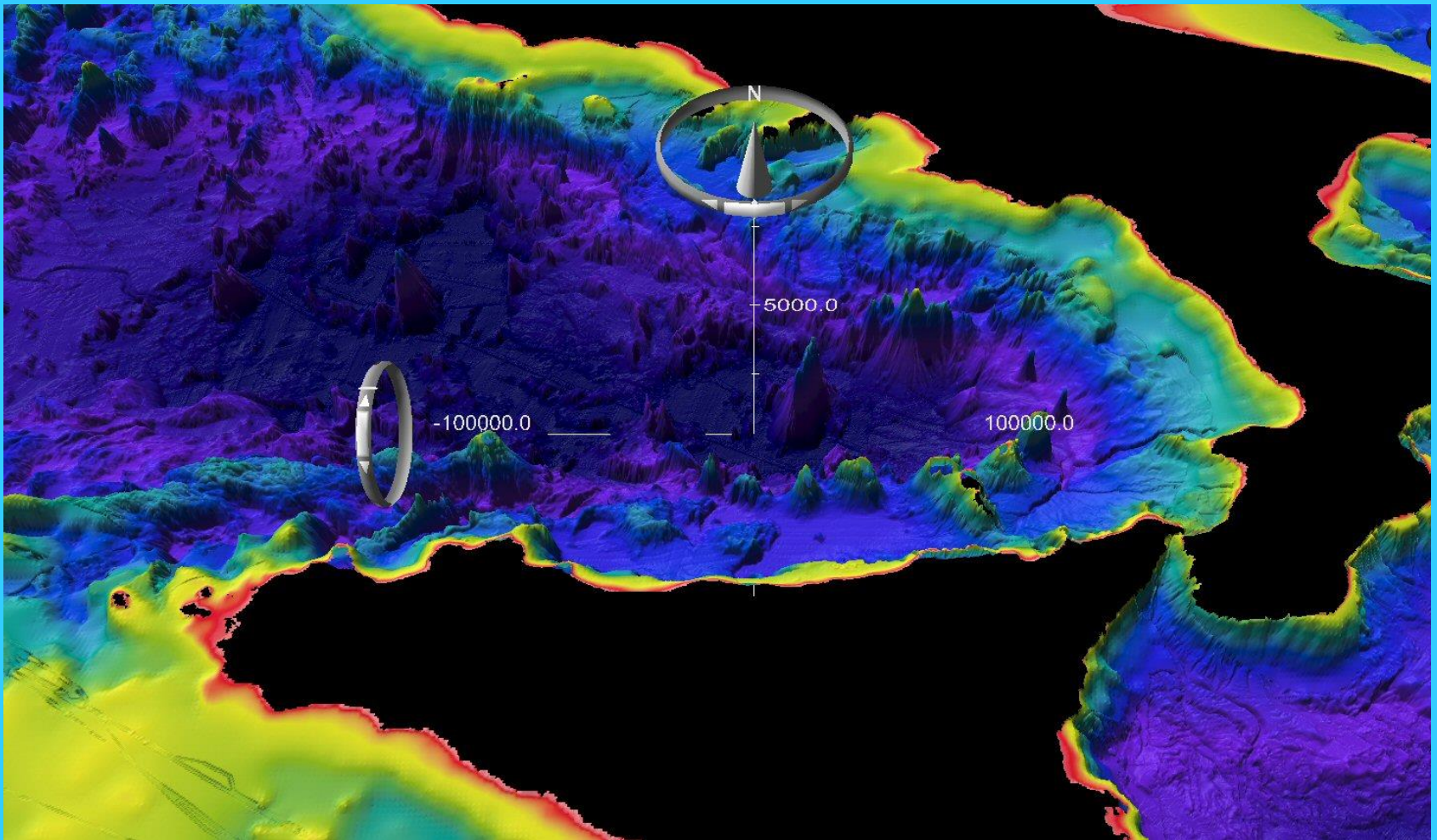


# EMODNet Hydrography



*Viewing service with digital bathymetry and overlay of CDI data sets*





*Using freely downloadable DTM tiles in 3D Viewer*

**EMODnet** European Marine Observation and Data Network

## Pilot Portal For Physical Parameters

Home Feedback How to

**Data type**

☐ Near RealTime  
☒ Historical









































**Parameters**


☐ Waves and winds  
☒ Sea water temperature  
☐ Sea water salinity  
☐ Currents  
☐ Light attenuation  
☐ Sea levels

**Sea area (EuroGOOS region)**

☐ Arctic Seas (Arctic ROOS)  
☐ Baltic Sea (BOOS)  
☐ Ireland-Biscay-Iberia Region (IBI-ROOS)  
☐ North Sea (NOOS)  
☐ Black Sea (BS-GOOS)  
☐ Mediterranean (MOON)

**Your selection**


Station name	Parameters	Delete	More Info
DublinPortTi...	 		
DundalkTide...	 		
GalwayPortT...	 		
HowthHarbo...	 		
KillybegsPor...	 		
MalinHeadT...	 		
Castletownb...	 		
BallyglassTi...	 		
WexfordTide...	 		
AranmoreTi...	 		

 Browse Data

**EMODnet Map**

Search by station name:

Layer switcher



4 23340 / 32.68506

*Near Real Time and long term Archived data sets of fixed operational oceanographic stations (ca 500) and Ferry Boxes*

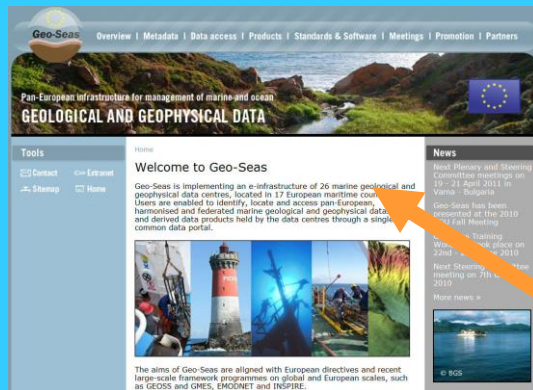


# EMODNet effects

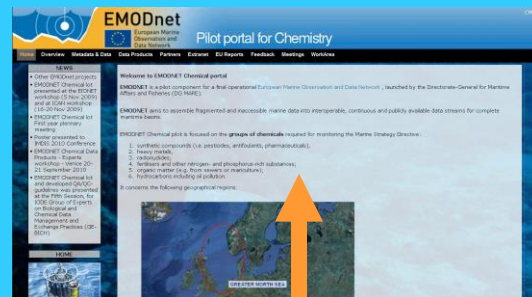


- The EMODNet projects and EU Research projects stimulate a wider uptake of SeaDataNet standards and contribute to enriching the standards and services
- Moreover the pilots encourage an expansion of the SeaDataNet infrastructure. At present already **83** data centres are connected and more underway.
- The EMODNet projects set requirements for making SeaDataNet data products and upgraded services which are fit for purpose for specific user communities: examples:
  - coupling WISE-Marine to EMODNet for MSFD reporting;
  - coupling MyOcean- Copernicus Marine Services to EMODNet for streamlining availability of physical data
- This includes providing traceability between data products and associated underlying basic data sets for possible re-analysis and confidence
- EMODNet is management and policy driven which also provides an excellent opportunity for SeaDataNet to upgrade its status from project to sustained operational infrastructure, while keeping research projects for innovations .

# CDI Service as common service in many projects



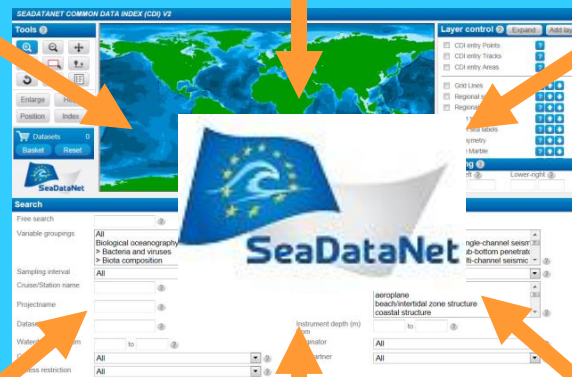
[www.geo-seas.eu](http://www.geo-seas.eu)



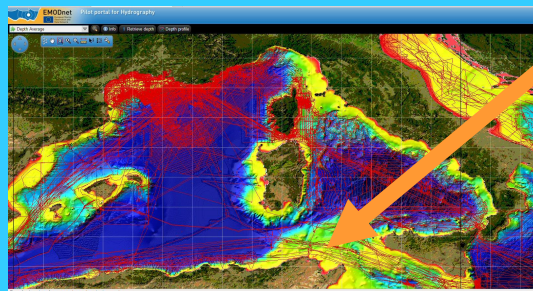
[www.emodnet-chemistry.eu](http://www.emodnet-chemistry.eu)



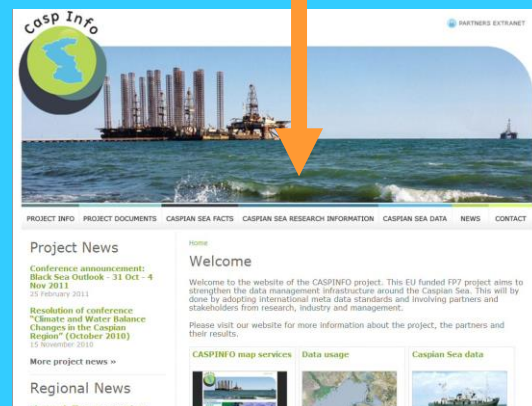
[www.blackseascene.net](http://www.blackseascene.net)



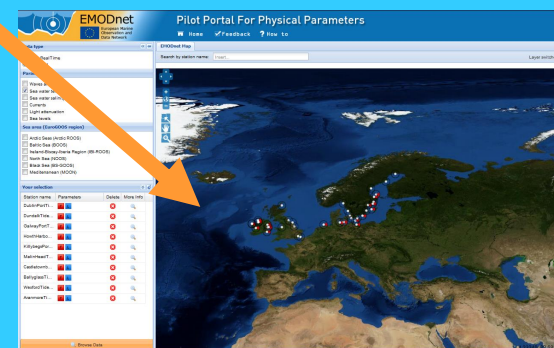
[www.seadatanet.eu](http://www.seadatanet.eu)



[www.emodnet-hydrography.eu](http://www.emodnet-hydrography.eu)

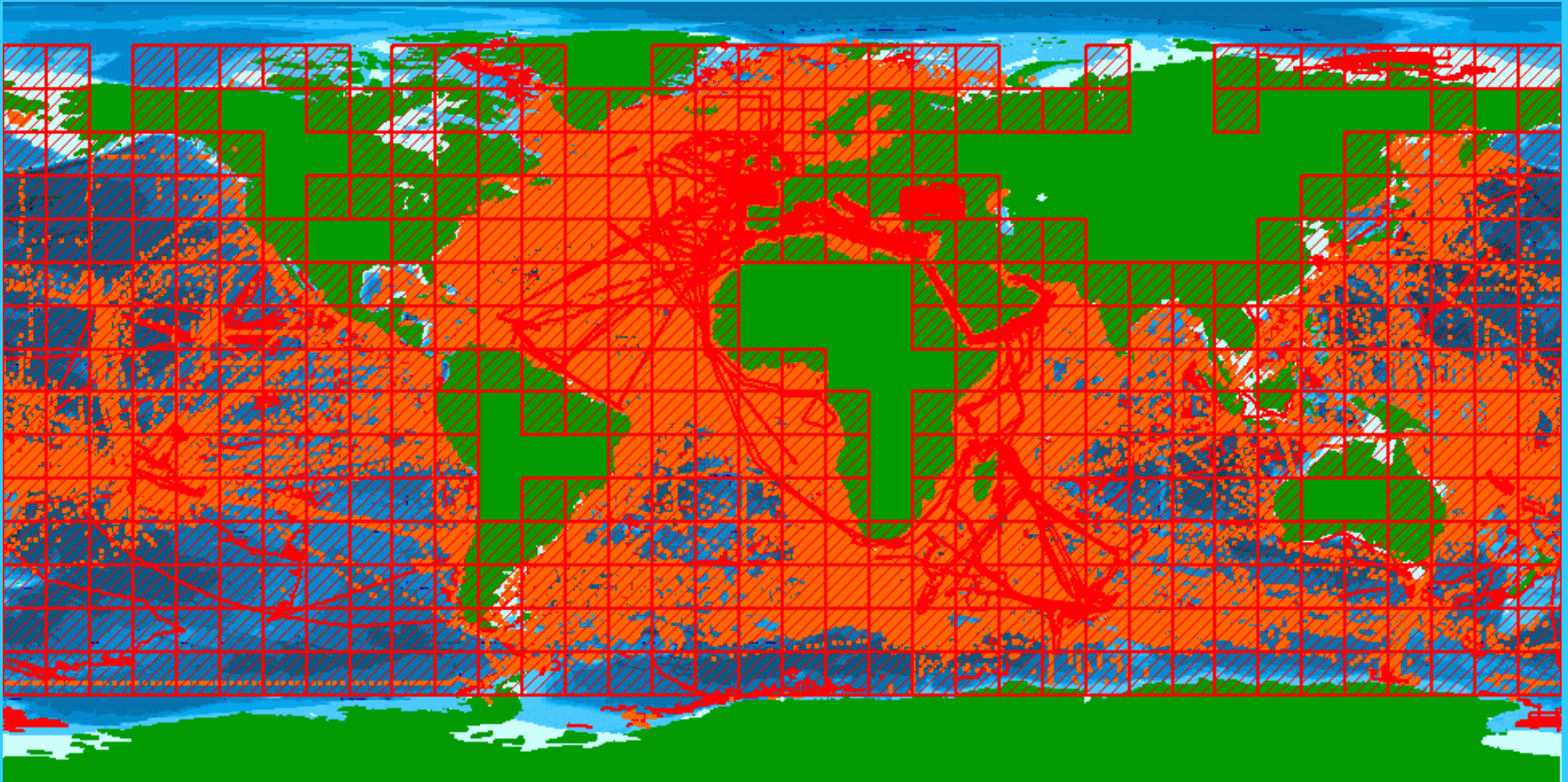


[www.caspinfo.net](http://www.caspinfo.net)



[www.emodnet-physics.eu](http://www.emodnet-physics.eu)

## CDI – Data Coverage – April 2013



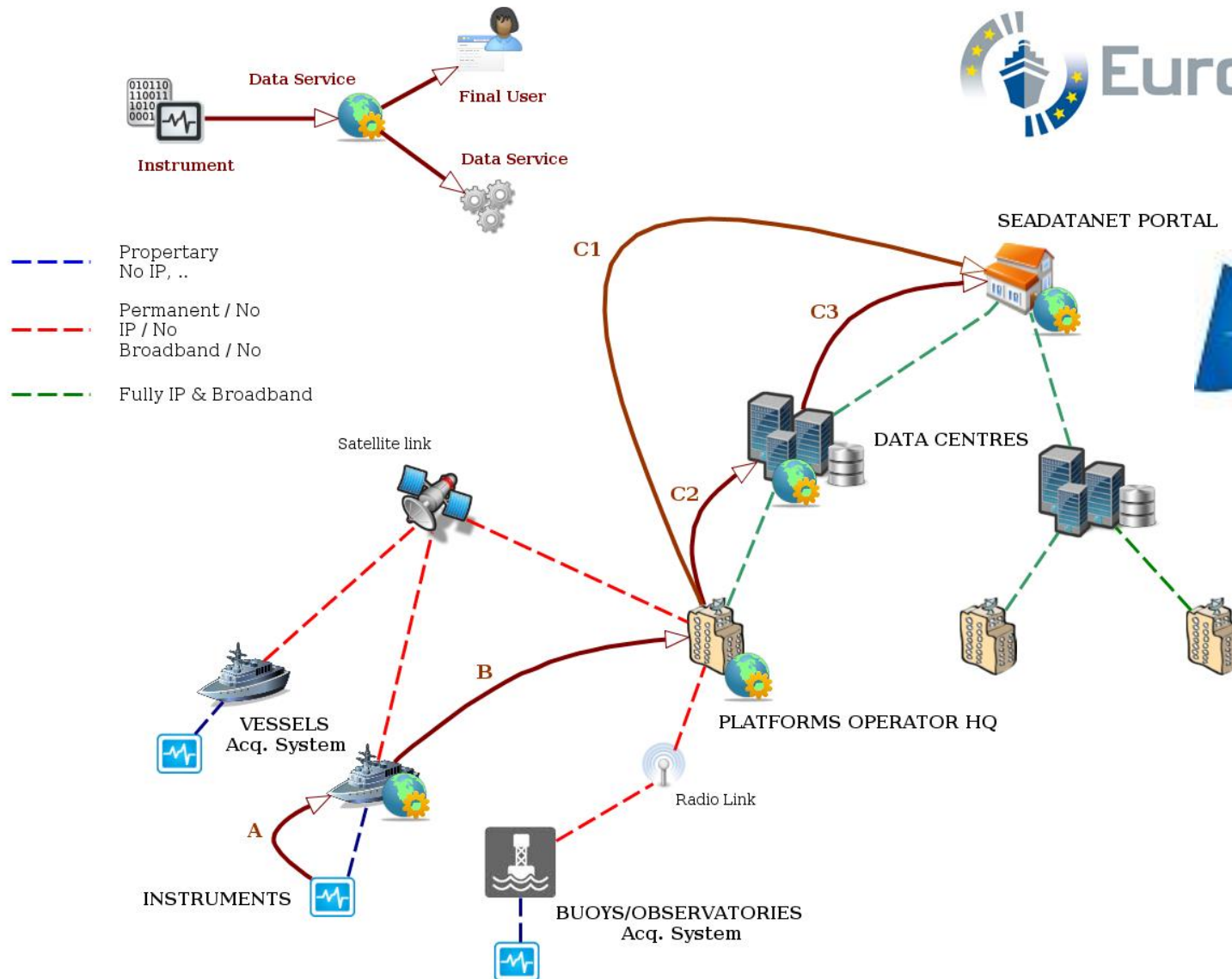
**> 1,3 million** CDI entries from **29** countries and **83** data centres and **435** originators for physics, chemistry, geology, geophysics, bathymetry and biology; years **1800 – 2013**; **90%** unrestricted or under SeaDataNet licence



# Ongoing developments in SeaDataNet II (2011 – 2015)

- Extending and finetuning the SeaDataNet standards for handling all types of marine and ocean data, in real-time and delayed mode
- Achieving full INSPIRE compliance and contributing to the INSPIRE process for developing implementing rules for oceanography
- Upgrading the existing SeaDataNet portal services and local software components for data access, and developing extended data access services for intermediate user communities (machine-to-machine), and new data viewing services, applying OGC, ISO and W3C standards
- Developing SensorWeb enablement for real-time data access
- Further developing interoperability with global portals, such as GEOSS and IODE-ODP
- Making the SeaDataNet operation more robust and covering a widening collection of marine and ocean metadata, data and data products, including high quality aggregated data sets (thematic and regional)

# Sensor Web Enablement for e-access



[WWW.SEADATANET.ORG](http://WWW.SEADATANET.ORG)







**SeaDataNet**

PAN-EUROPEAN INFRASTRUCTURE  
FOR OCEAN & MARINE DATA  
MANAGEMENT

Geo-Seas, Cork, October 9-10, 2012

## ***IMDIS: International conference on Marine Data and Information Systems***

- Organised in the frame of SeaDataNet
- In Lucca, Italy, 23-25 September 2013
- 4 topics
  - Marine information and data management
  - Marine environmental data bases: infrastructures and data access systems
  - Data services in ocean science
  - Services for users and education