



SeaDataNet – pan-European infrastructure for ocean and marine data management and its relation to EMODNet and GEOSS

By

**Dick M.A. Schaap – MARIS
SeaDataNet Technical Coordinator**

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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

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

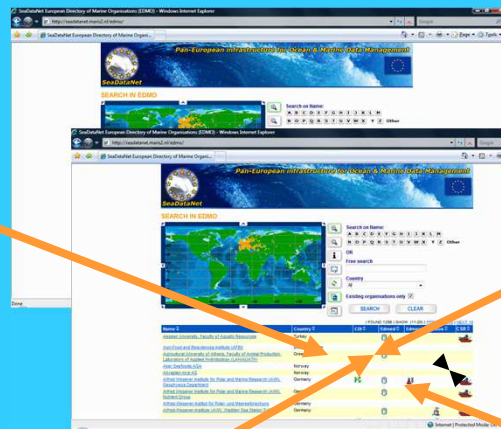
The SeaDataNet portal provides overviews of marine organisations in Europe and their engagement in research, scientific cruises, monitoring and data management for European waters and global oceans:

- **EDMO**: European Directory of Marine Organisations (>2200 entries)
- **EDMED**: European Directory of Marine Environmental Data sets (>3000 entries)
- **EDMERP**: European Directory of Marine Environmental Research Projects (>2500 entries)
- **CSR**: Cruise Summary Reports (>31500 entries)
- **EDIOS**: European Directory of Ocean-observing Systems (>270 programmes for the UK alone and many underway for other European countries)

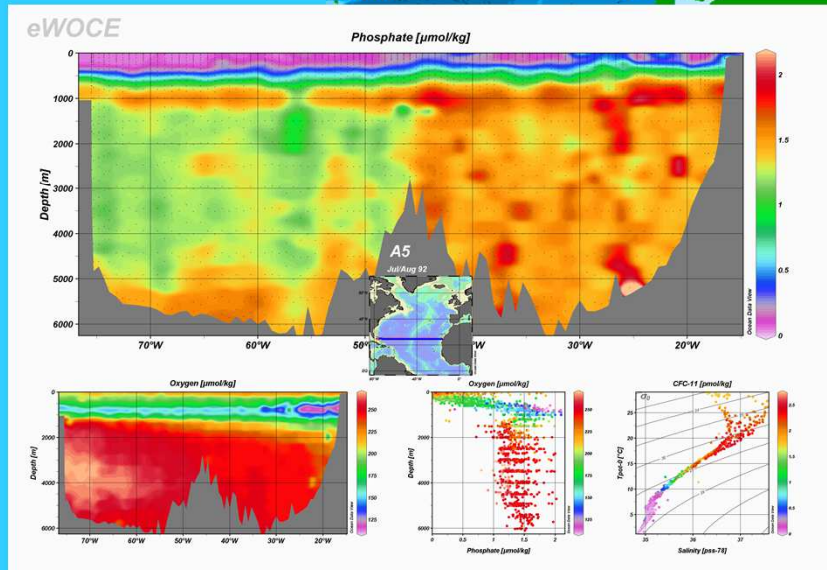
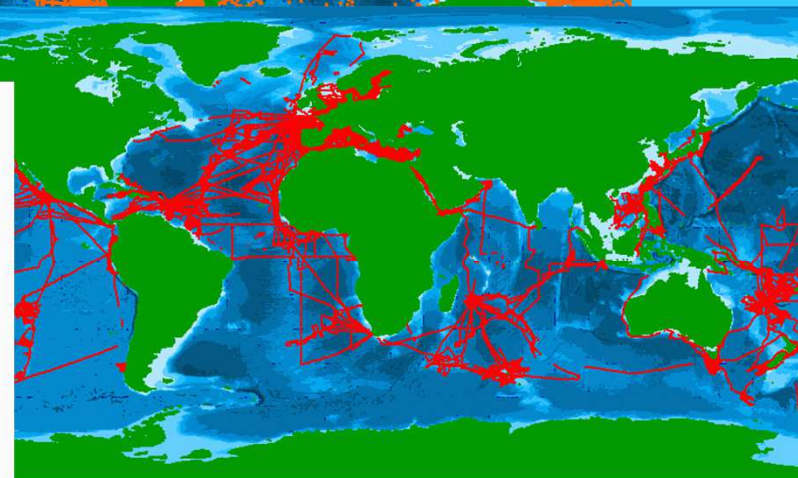
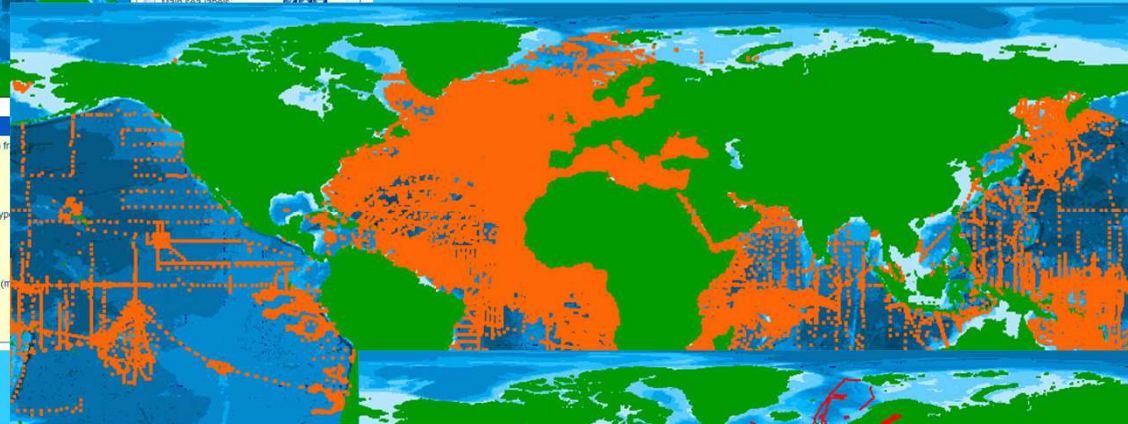
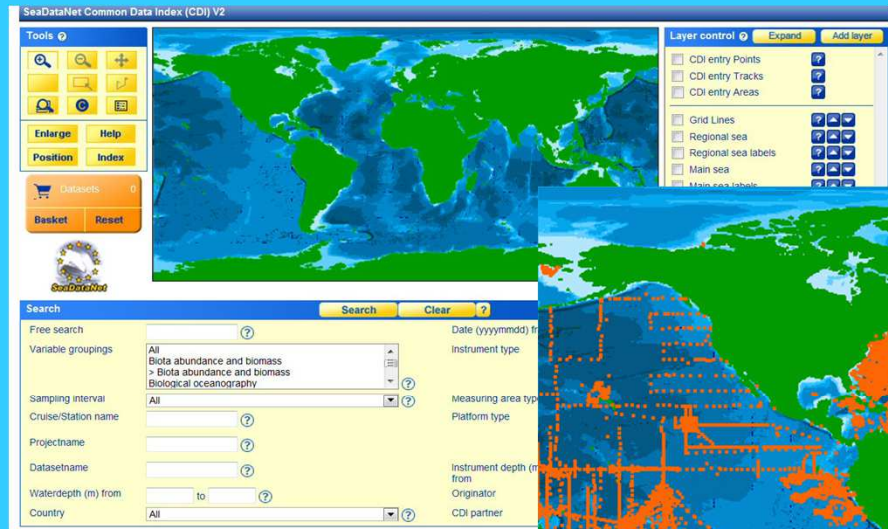
These Directories are maintained by NODCs for their country and published at pan-European level

Pan-European Directory Services

All these Directories have been harmonised and mutually tuned in format, syntax and semantics (common vocabularies), a common XML editor (MIKADO), online CMS and online user interfaces.



SeaDataNet from data discovery to unified access to analysis



SeaDataNet Data Policy and implementation

■ Metadata

- free and open access, no registration required
- each data centre is obliged to provide the meta-data in standardized format to populate the catalogue services

■ Data and products services

- the general case is free and open access
- however users must register once in order to get a personal login - password
 - Web form to provide necessary information
 - User agrees with "**SeaDataNet User Licence**"
 - After processing, login/password sent by email (email check)

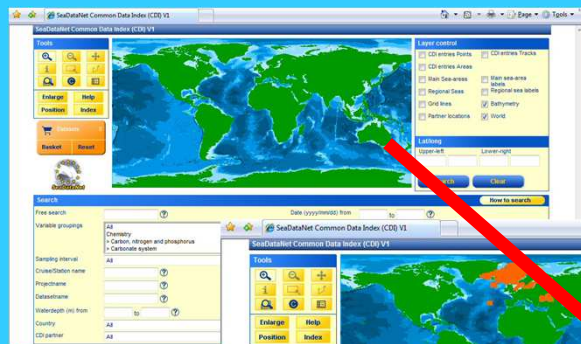
- Licence is part of the **SeaDataNet Data Policy**, that is intended to be fully compatible with the Directive of the European Parliament and of the Council on public access to environmental information, the INSPIRE Directive, IOC, ICES, WMO, GCOS, GEOSS and CLIVAR data principles.

- SeaDataNet Data Policy is an overarching policy, respecting any local policy

- Registration is also required to facilitate the follow-up of a user request to multiple data centres (asynchronous processing)

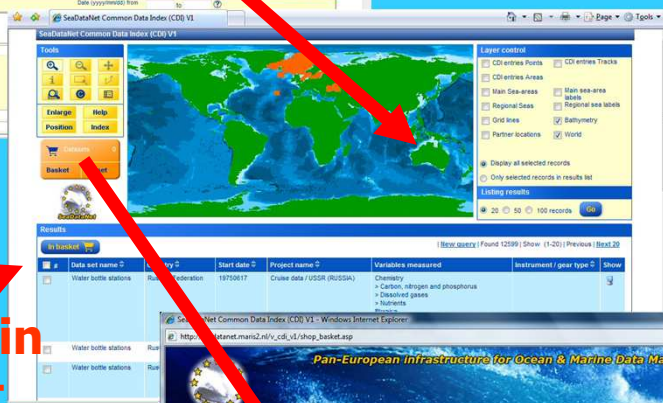
- Each user gets a SeaDataNet Role; while each CDI record has a 'Data access restriction' label. The combination of role and access label determines '**access OK**', '**access to be discussed**' or '**access denied**'

Common Data Index – Data Discovery and Access Service



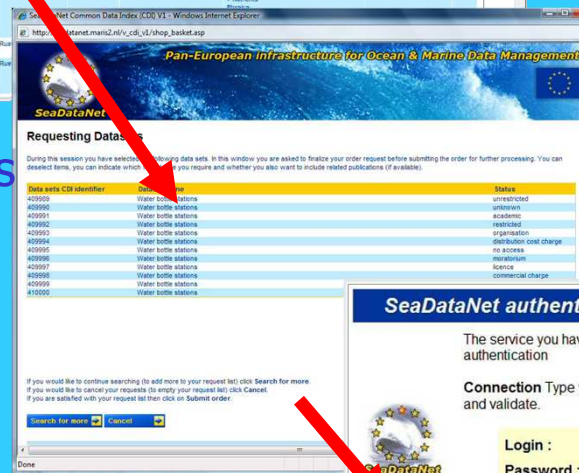
Search

Include in Basket



Results

Request Confirmed

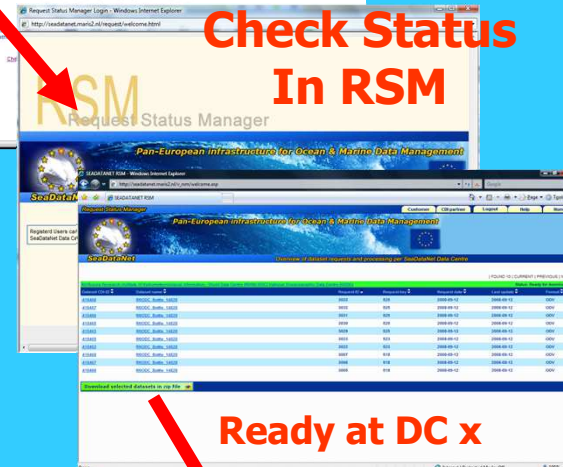


Shopping list

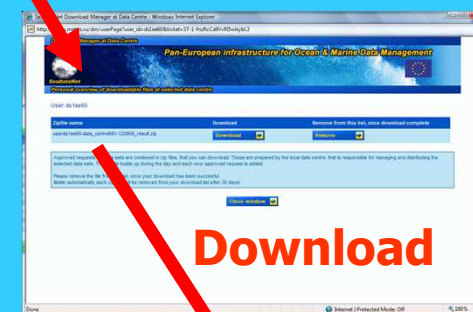
Submit + Authentication



Check Status In RSM



Ready at DC x

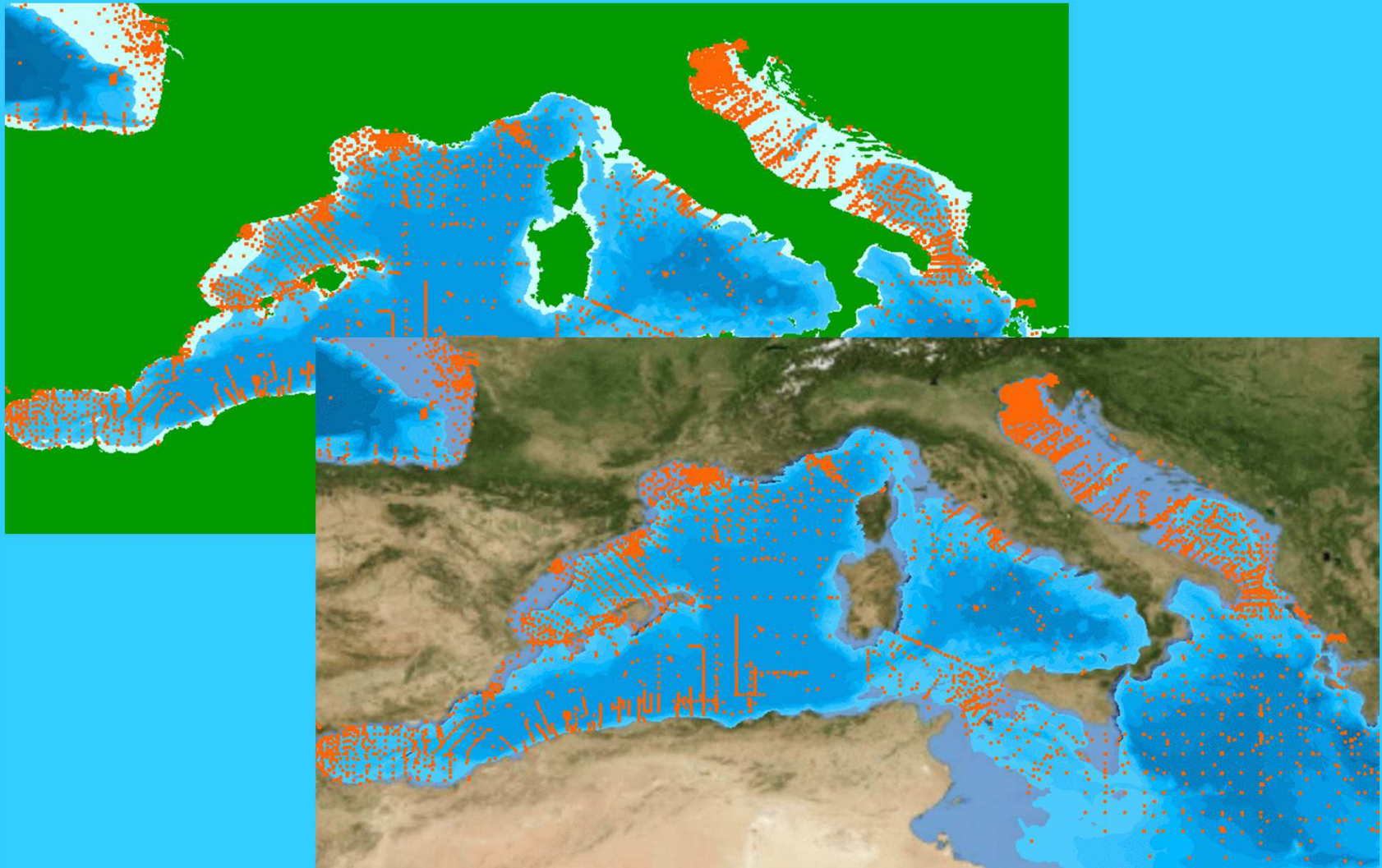


Download

Data

SDN format

SeaDataNet CDI Search interface



- Searching for nutrients – results map zoom

SeaDataNet Viewing services

■ Ocean Data View (ODV)

- General data analysis and visualization software
- >10,000 registered users

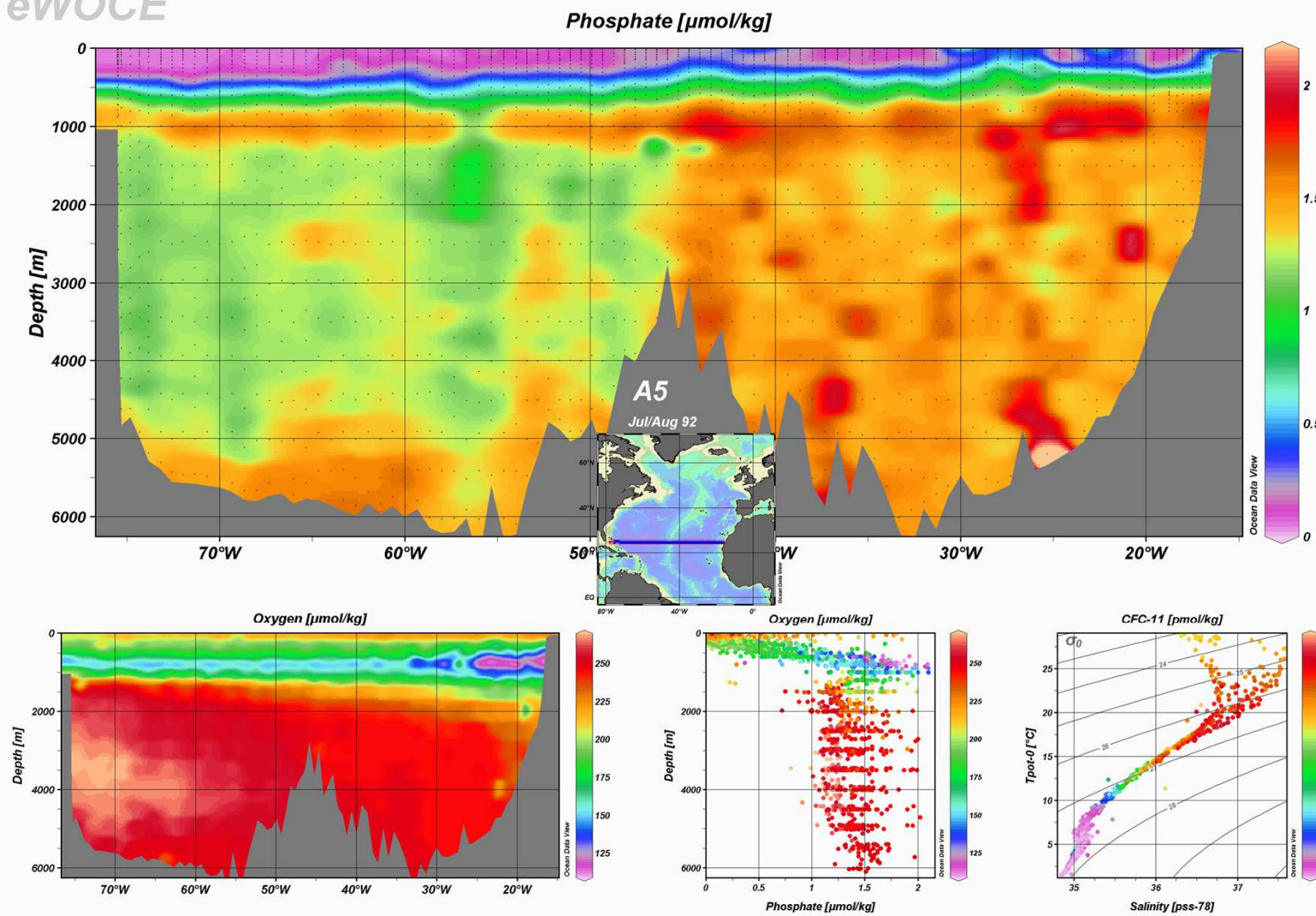
■ ODV software upgraded to ODV4 for:

- 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

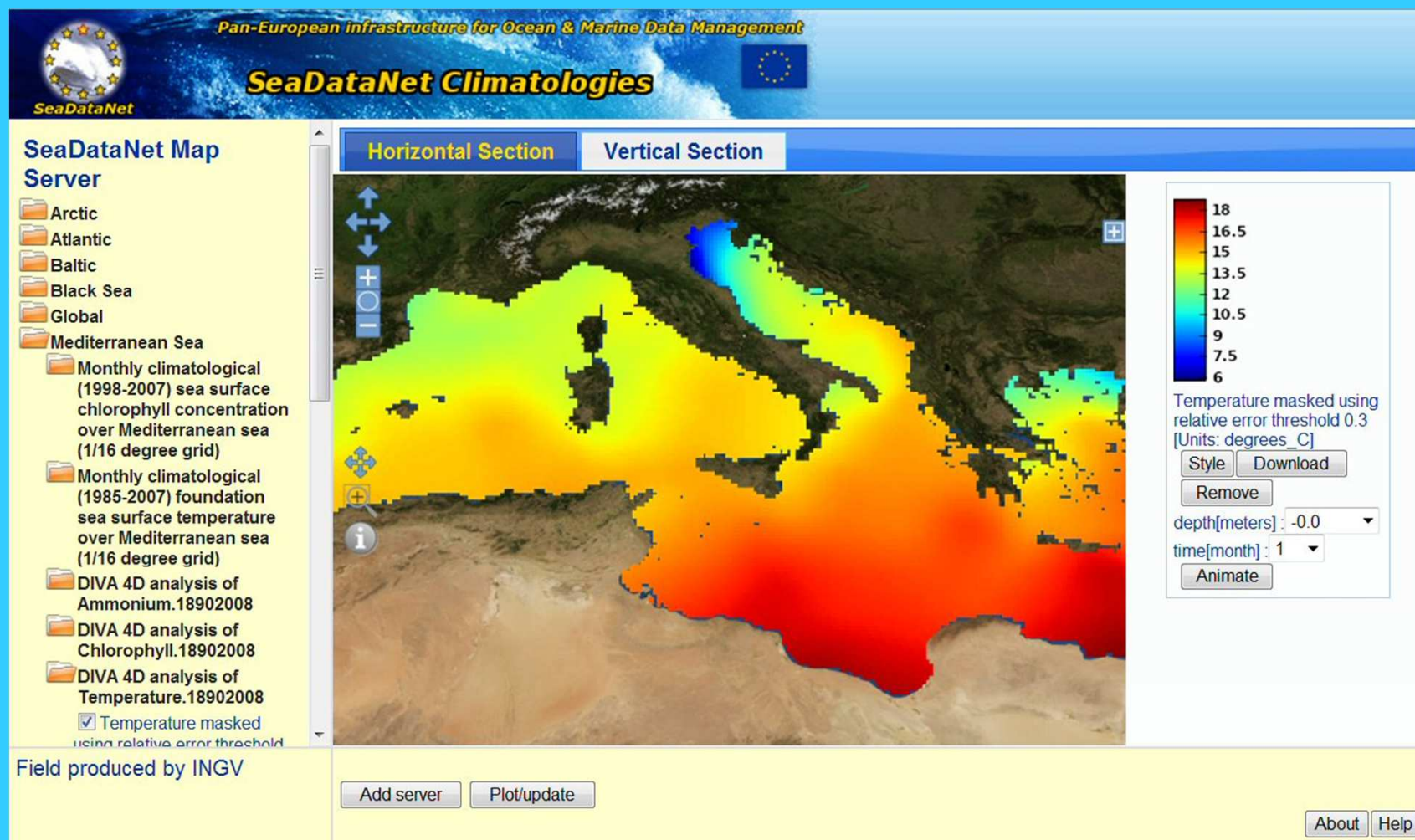
- **DIVA** software (Data-Interpolating Variational Analysis) allows to spatially interpolate observations on a regular grid in an optimal way. The analysis is performed on a finite element grid allowing for a spatial variable resolution and a good representation of the coastline and isobaths.

SeaDataNet Viewing services – ODV + DIVA

eWOCE



Regional Products services



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

Cross sector involvement

- SeaDataNet cooperates and provides services for many other European and international groups and projects, contributing and safeguarding good data management. Examples:
 - **EuroGOOS**, maintaining the European Directory of Ocean observing systems (EDIOS) and quality controlling and archiving long-term data series. See www.edios.org
 - **GMES Marine Core Services** for streamlining the provision of long-term archives for optimising marine forecast services; **SeaDataNet** has an MoU with **MyOcean** to formalise the cooperation
 - **POGO**, collecting and providing information on ocean-going research vessels, and their operators, planned and completed cruises. See www.pogo-oceancruises.org
 - Services for the international oil & gas industry for metocean data (**SIMORC**). See www.simorc.org

SeaDataNet Expansion

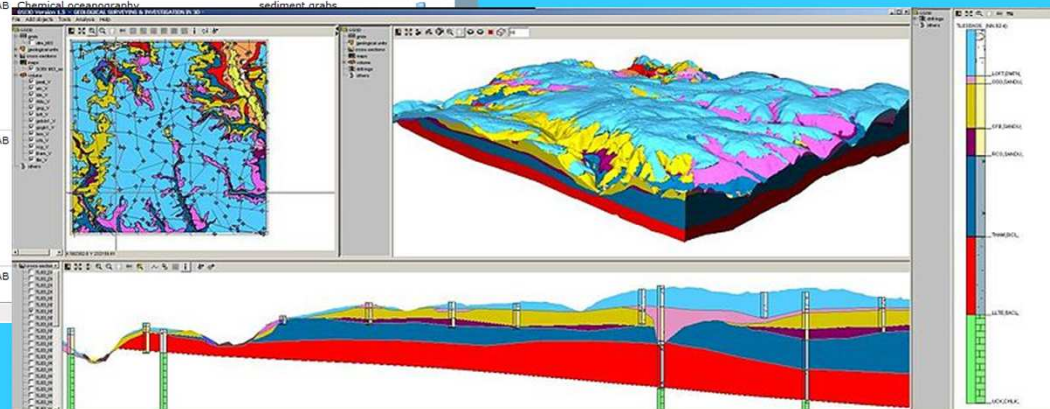
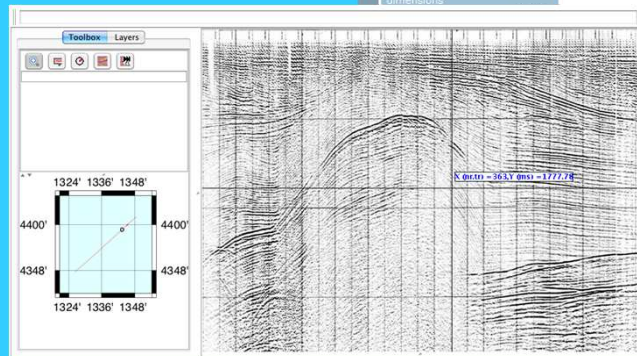
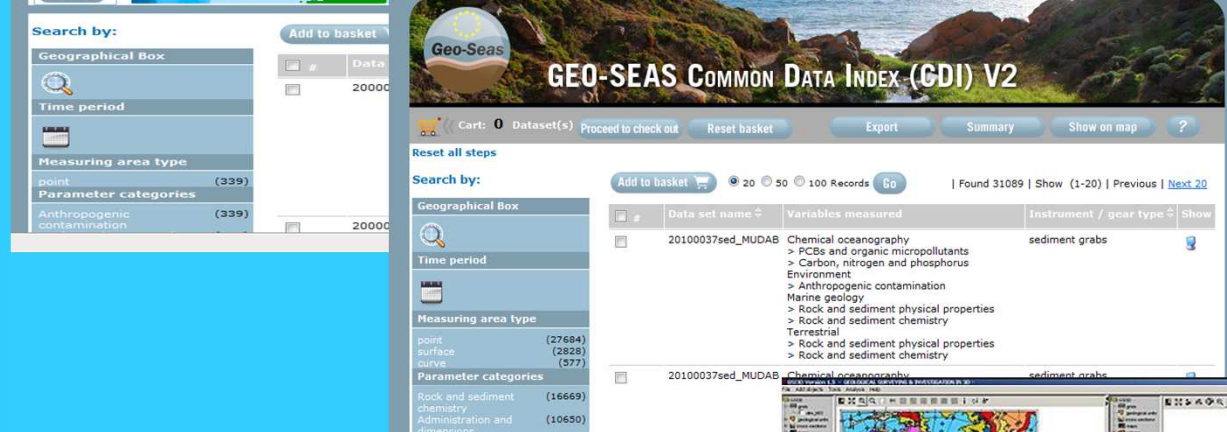
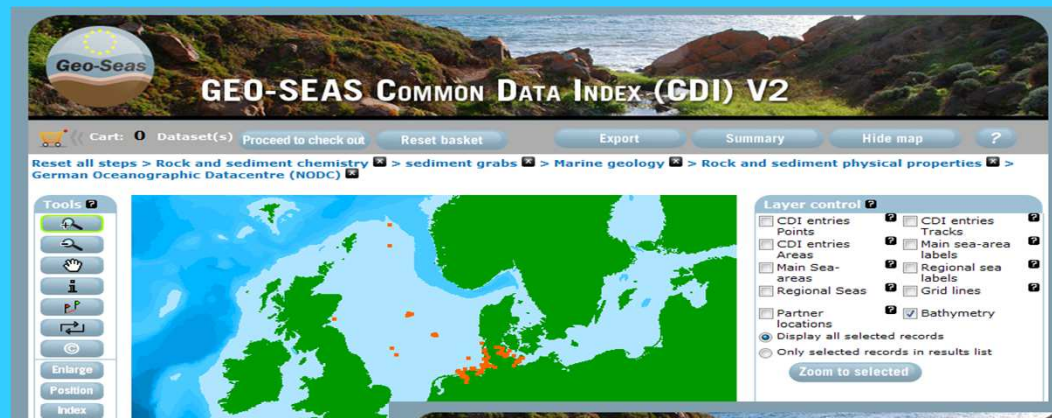
- SeaDataNet standards and tools are being adopted by other EU-funded projects:
 - **Up-Grade Black Sea SCENE project**, (2009 – 2011) involving 6 NODCs and many other data holding institutes from the 6 Black Sea countries, to provide metadata and data access and to strengthen their national NODC networks. EU-funding 3.4 Million Euro.
 - **CASPINFO project**, (2009 – 2011) involving 12 institutes and private industry from the Caspian Sea region, to provide metadata and data access and to build their capacity for data management and user services. EU-funding 0.8 Million Euro.
 - **Geo-Seas project**, (2009-2012) involving 24 geological and geophysical data centres from 16 European countries (EuroGeoSurveys), to provide metadata and data access. EU-funding 4.9 Million Euro.
 - **EuroFleets project**, (2009-2012) involving 24 research institutes and data centres from 17 European countries, to optimise the management of research vessels and to streamline the flow of data from the research cruises to the data centre infrastructure. EU-funding 7.2 Million Euro.
 - **JERICO project**, (2011-2015) involving 27 institutes from 17 European countries, to develop better coordination between the coastal observatories responsible for physical and bio-chemistry parameters as well as to develop improved procedures for streamlining the flow of data from the monitoring stations to the data centre infrastructure. EU-funding 6.5 Million Euro.
- In each project several SeaDataNet partners are participating for transfer of knowledge & expertise, to secure interoperability and to achieve crossfertilisation leading to upgrading of the SeaDataNet standards and tools as well as enriching of the services.



Geo-Seas

*a pan-European network for marine
geoscientific data linking 26 marine
geoscience data centres from
17 coastal countries*





Developing viewer software and services for visualisation of data

European Marine Observation and Data Network



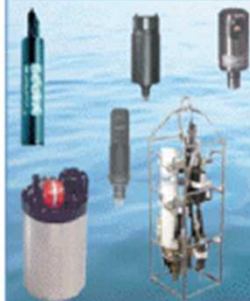
EMODnet



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. CO₂, CH₄, 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



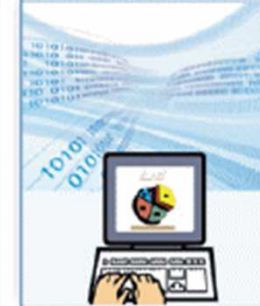
- satcom
- GSM, GPRS
- fibre optics
- acoustics

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 and EMODNET



- SeaDataNet has qualified itself as leading infrastructure for the EMODNet data management component and is leading 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.

EMODNet Chemistry



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

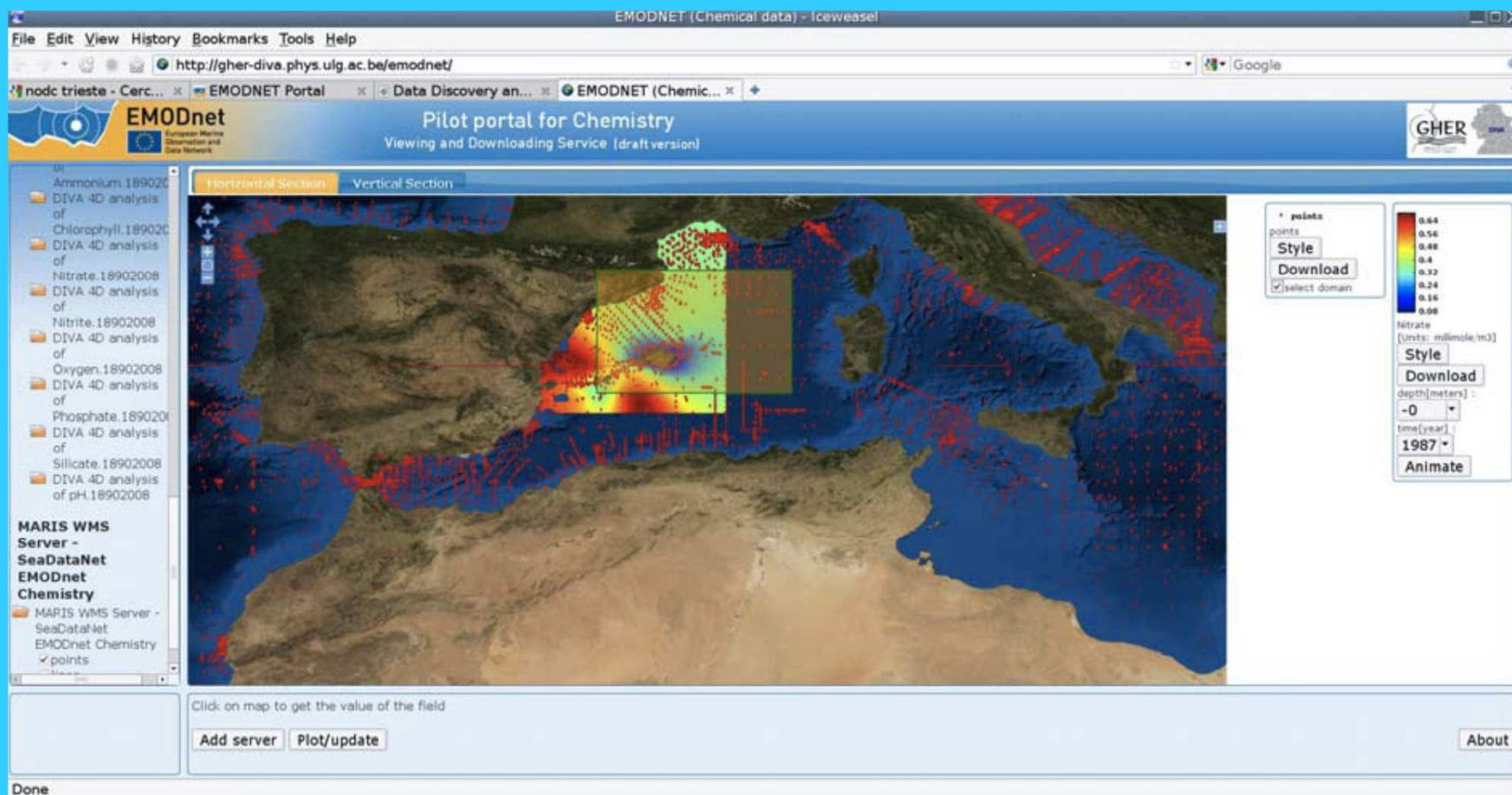
20 50 100 records Go

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	

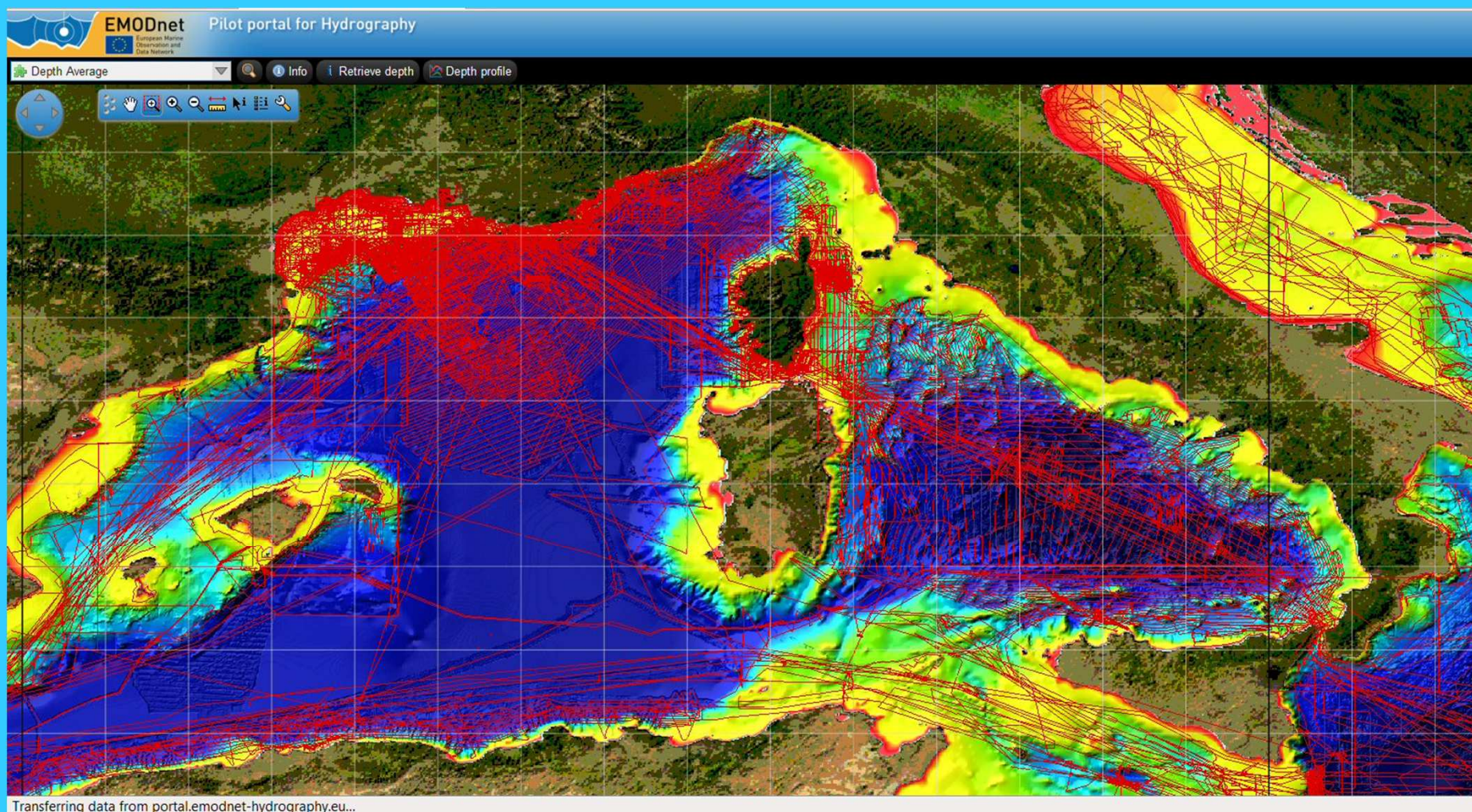
CDI service with overview of chemistry data sets for the Black Sea region

EMODNet Chemistry



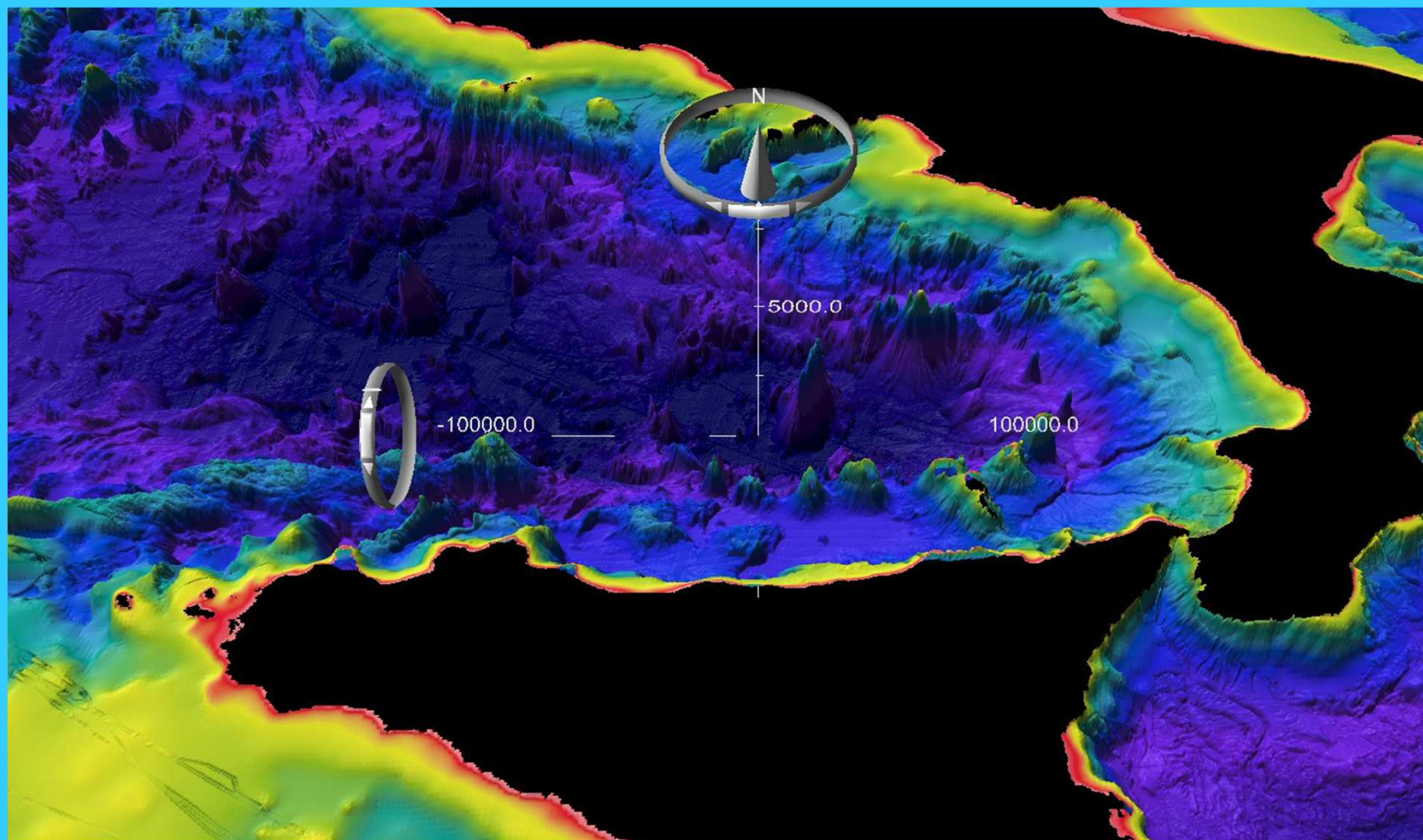
Viewing service for Nitrate distribution in the Balearic spot with overlay of CDI data sets

EMODNet Hydrography



Viewing service with digital bathymetry and overlay of CDI data sets

EMODNet Hydrography



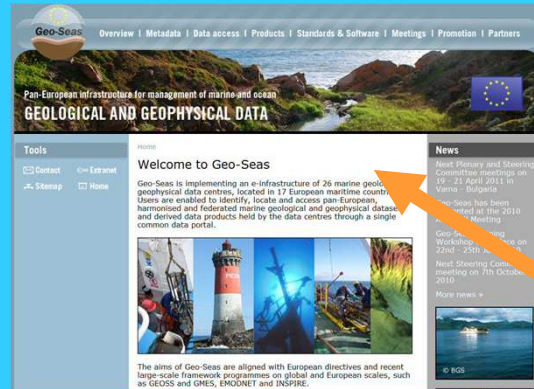
Using freely downloadable DTM tiles in 3D Viewer

EMODNet effects

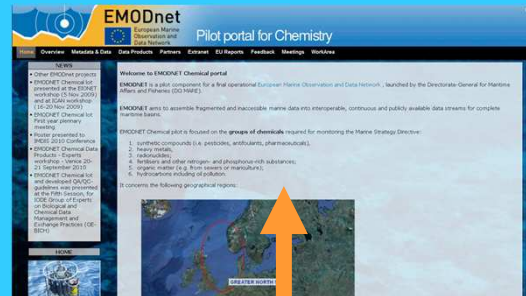


- The EMODNet pilots and EU Research projects stimulate a wider uptake of SeaDataNet standards and contribute to enriching the standards and services
- Moreover the pilots encourage an expansion of the SeaDataNet infrastructure. At present already 68 data centres are connected and more underway.
- The EMODNet pilots 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- GMES Marine Core 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



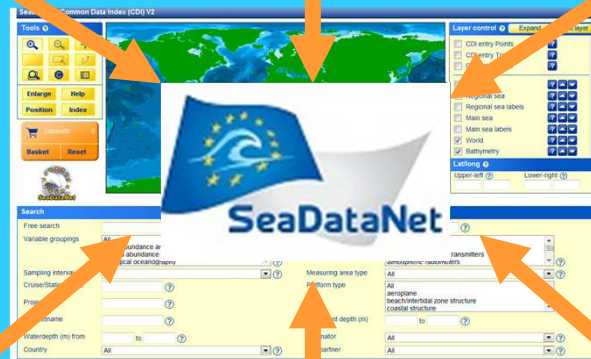
www.emodnet-chemistry.eu



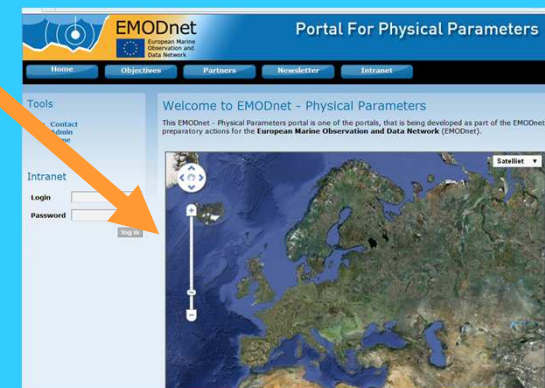
www.blackseascene.net



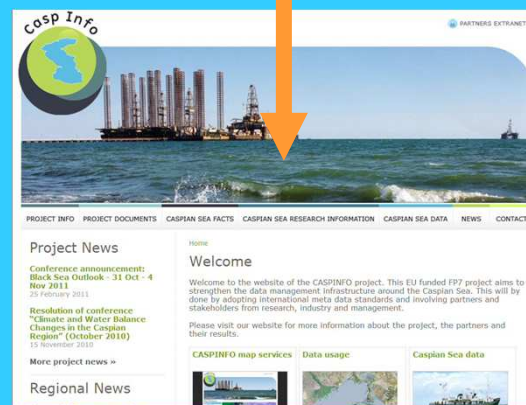
www.emodnet-hydrography.eu



www.seadatanet.eu

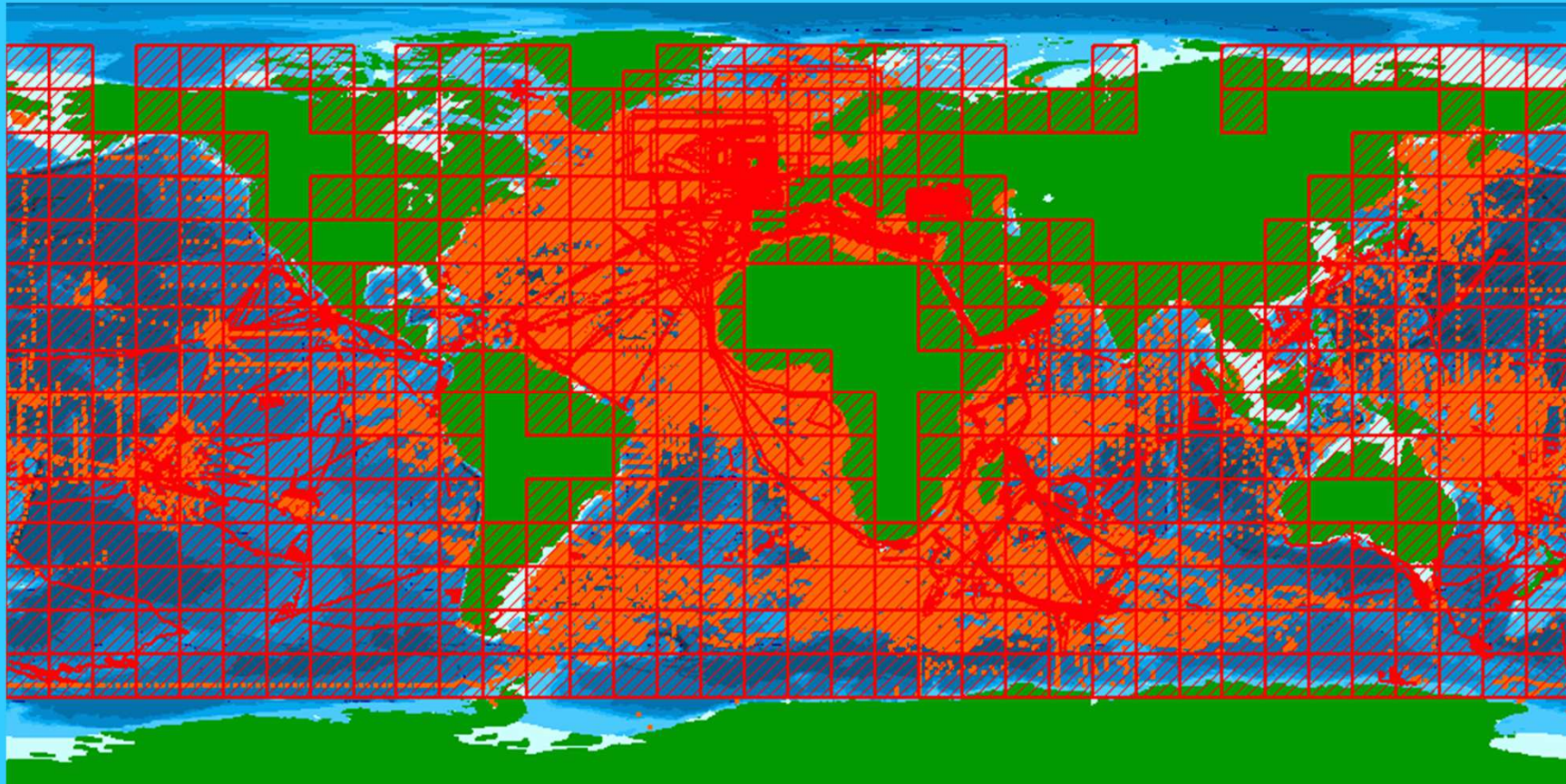


www.emodnet-physics.eu



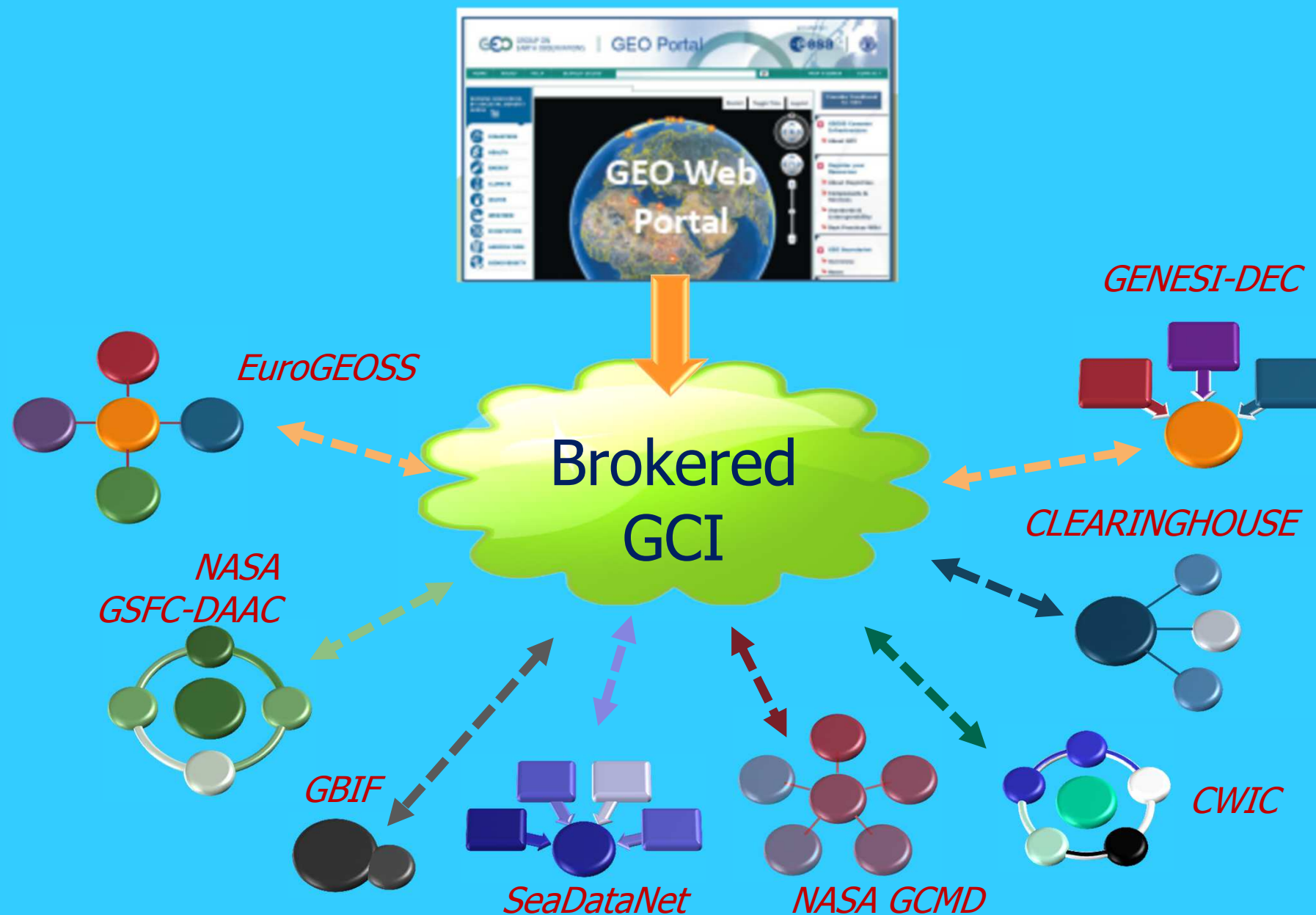
www.caspinfo.net

CDI – Data Coverage – January 2012



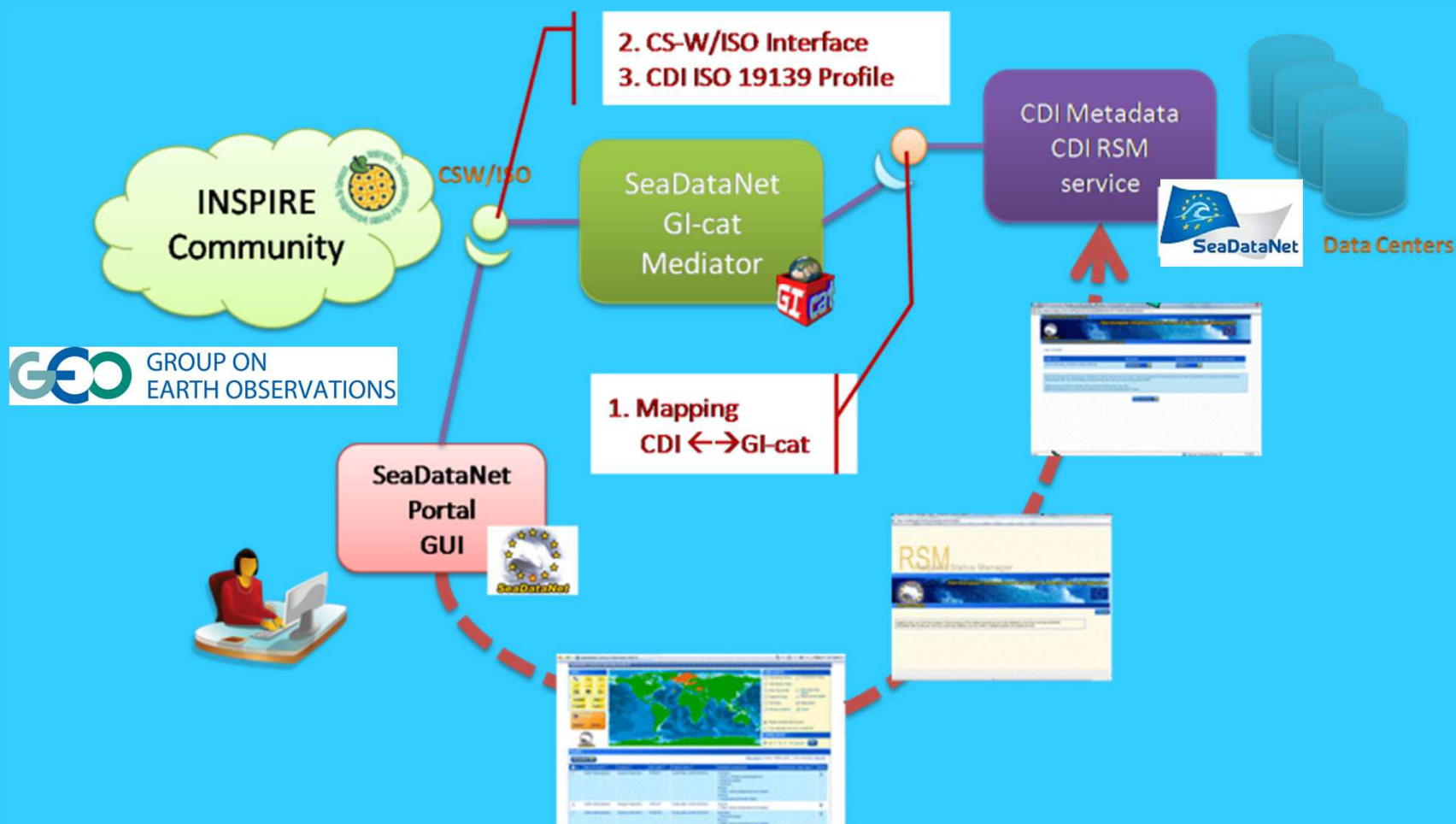
> 1 million CDI entries from **29** countries and **68** data centres and **379** originators for physics, chemistry, geology, geophysics, bathymetry and biology; years **1800 – 2011**; **88%** unrestricted or under SeaDataNet licence

SeaDataNet – GEOSS portal via EuroGEOSS Broker



CDI - INSPIRE compliance - GEOSS

- CS-W service established on top of the CDI portal to deliver INSPIRE compliant SeaDataNet references, aggregated by discipline and by data centre, using EuroGEOSS brokerage service, powered by GI-Cat



Discovery of SeaDataNet data from Genesi-DEC portal

The screenshot shows the Genesi-DEC portal interface. The top navigation bar includes 'GENESI-DEC :: Federated Search' and a search bar with the text 'seadatanet'. Below the search bar, a list of search results is displayed, including 'SeaDataNet/GeoSeas - Marine geological data - Discipline: Terrestrial'. A map of Europe is shown with a red arrow pointing to the 'Geo-Seas Common Data Index (CDI) V2' interface. The CDI interface includes a map of Europe with a red arrow pointing to the 'Geo-Seas Common Data Index (CDI) V2' interface. The CDI interface also includes a table of search results with columns for 'Data set name', 'Variables measured', and 'Instrument / gear type'.

Data set name	Variables measured	Instrument / gear type
sediment_7911	Chemical oceanography > PCBs and organic micropollutants > Other inorganic chemical measurements > Metal and metallo concentrations > Halocarbons (including freons) > Carbon, nitrogen and phosphorus Environment > Anthropogenic contamination Marine geology > Rock and sediment chemistry Terrestrial > Rock and sediment chemistry	sediment grabs
sediment_7910	Chemical oceanography > PCBs and organic micropollutants > Other inorganic chemical measurements > Metal and metallo concentrations > Halocarbons (including freons) > Carbon, nitrogen and phosphorus Environment > Anthropogenic contamination Marine geology > Rock and sediment chemistry Terrestrial > Rock and sediment chemistry	sediment grabs

Via OpenSearch interface on top of SeaDataNet CDI interface

Next step: security framework interoperability from OpenID to SeaDataNet CAS system

Ongoing developments in SeaDataNet II (2011 – 2015)

- Extending and finetuning the SeaDataNet standards for handling all types of marine and ocean data, in realtime 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 realtime 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)

WWW.SEADATANET.ORG

