



SeaDataNet, Pan-European infrastructure for marine and ocean data management

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EMODNET Preparatory Action Hydrographic and Seabed Mapping

By

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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

Interoperability

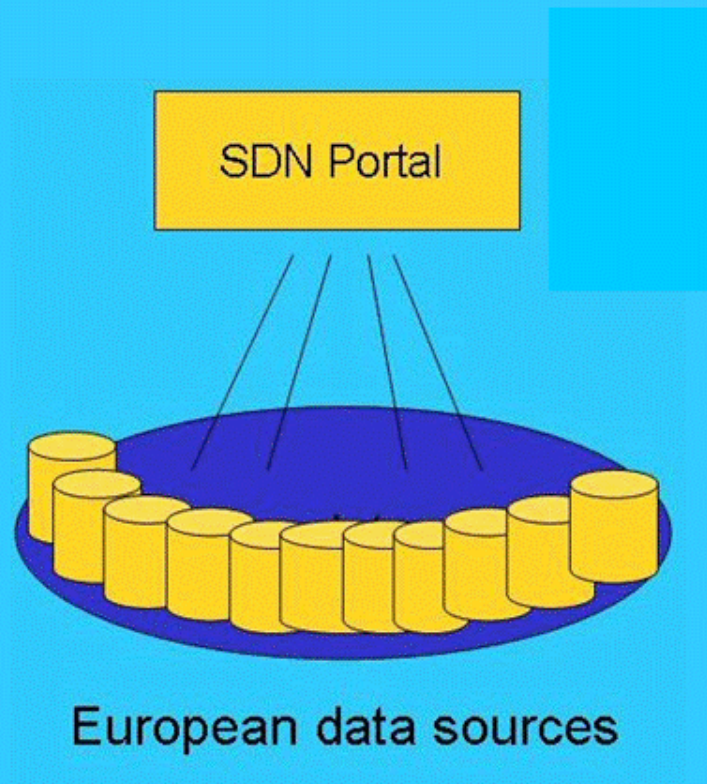
Interoperability is the key to distributed data management system success. This is achieved in SeaDataNet via:

- Adopting the ISO 19115 metadata standard for all metadata directories
- Providing XML Validation Services to quality control the metadata maintenance
- Using common and controlled vocabularies, including international content governance
- Providing standard metadata entry tools
- Using harmonised Data Transport Formats for data sets delivery
- Using common quality control protocols and flag scale
- Adopting of OGC standards for mapping and viewing services
- Using SOAP Web Services in the SeaDataNet architecture
- Organising training and instruction workshops for transfer of expertise and hands-on training

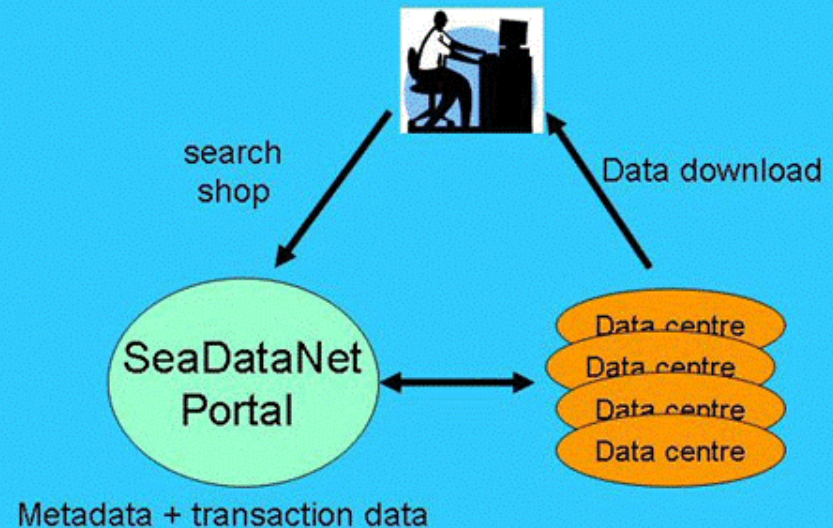
SeaDataNet Main facts

- 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

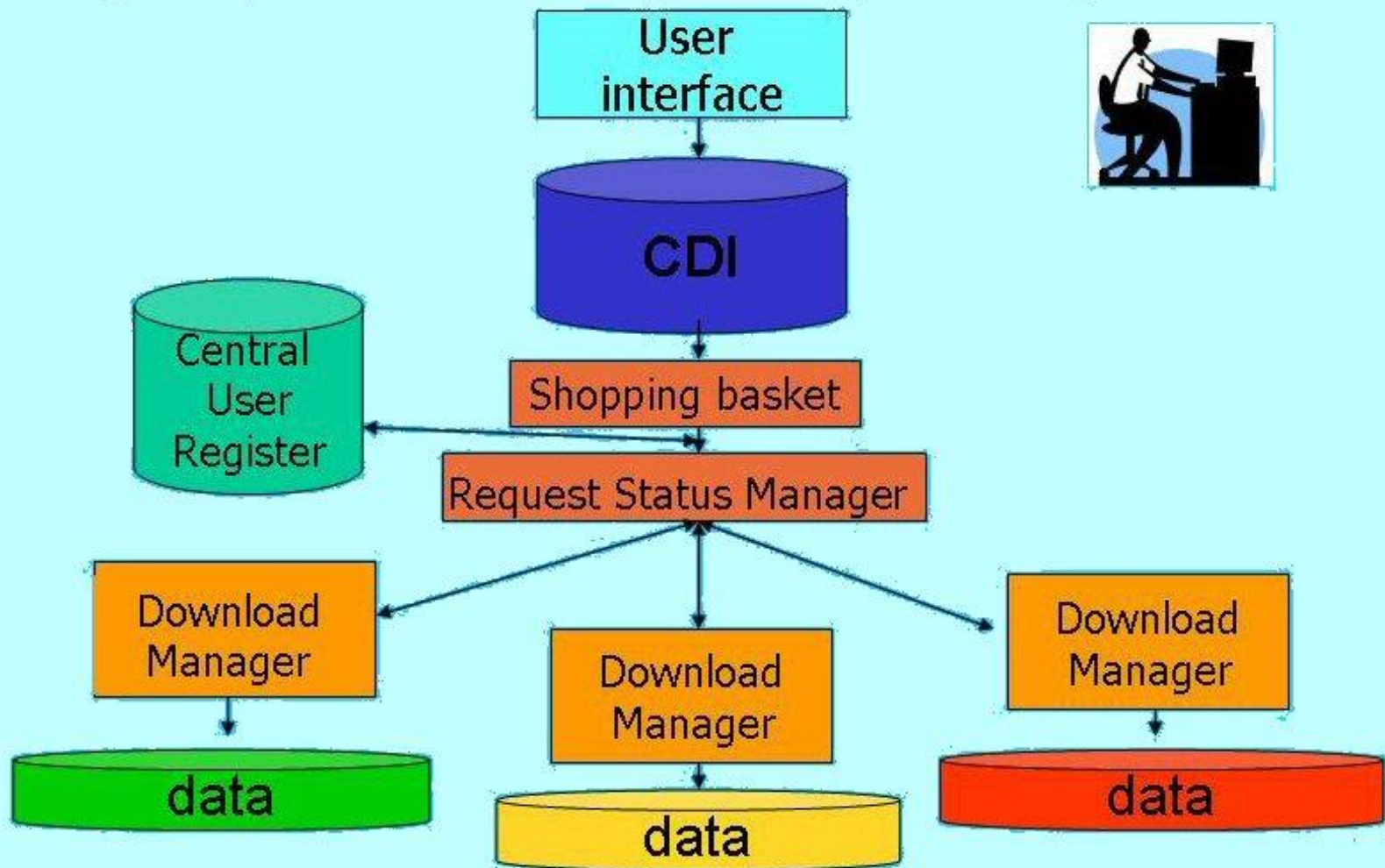
From data discovery to unified data access and delivery



Common Data Index (CDI) Data Discovery and Access Service

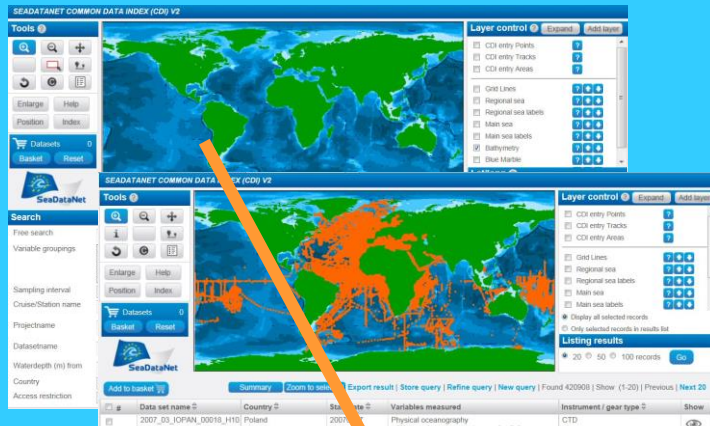


Delivery Services – system set-up and process



Common Data Index – Data Discovery and Access Service

Search



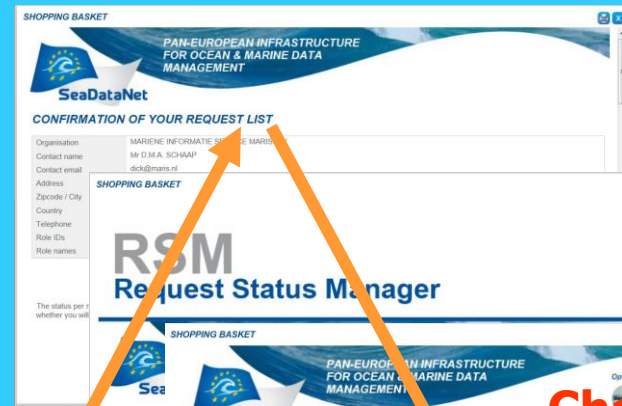
Include in Basket

Results

Shopping list



Submit + Authentication



Request Confirmed

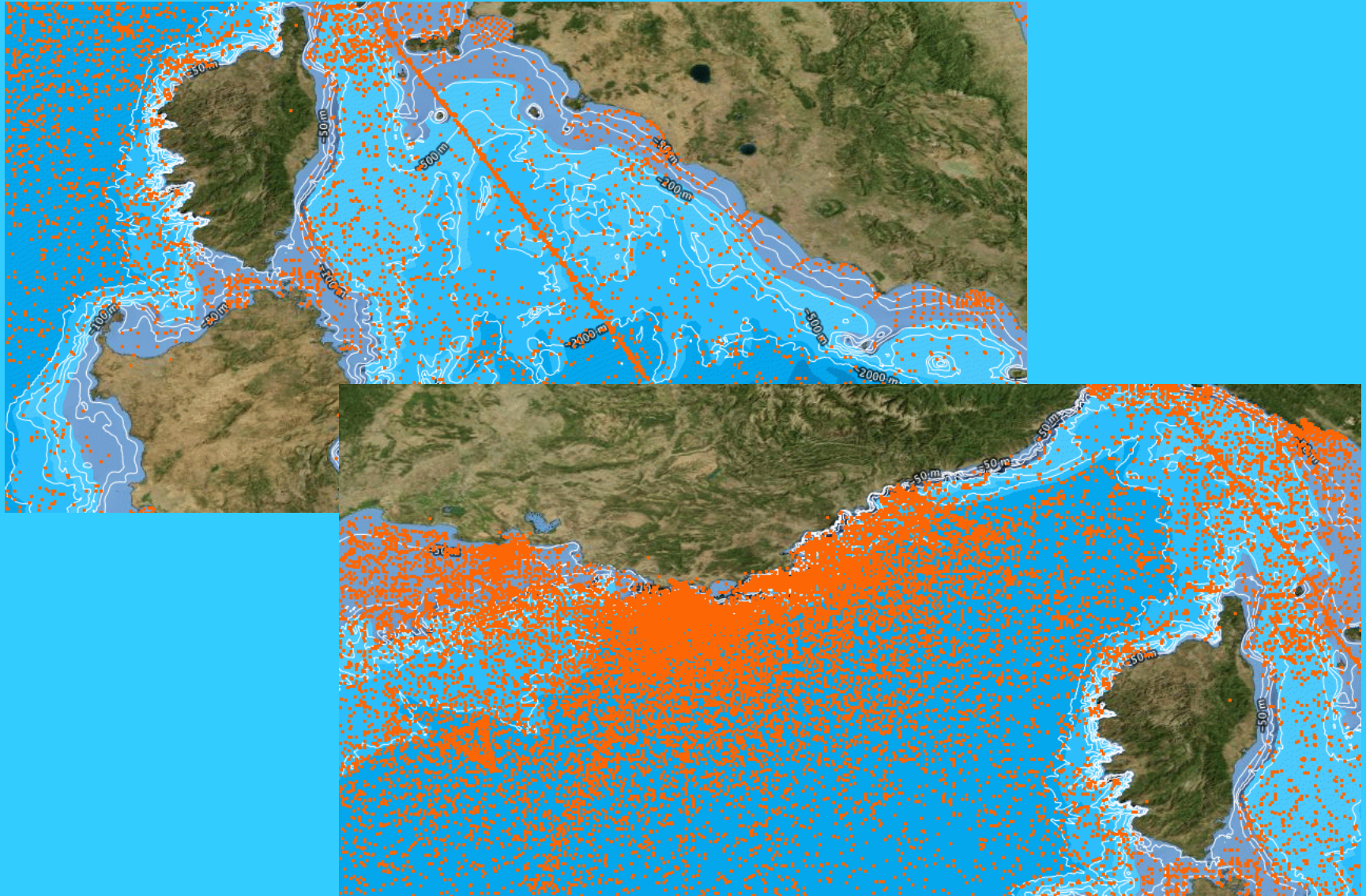
Check Status In RSM



Download

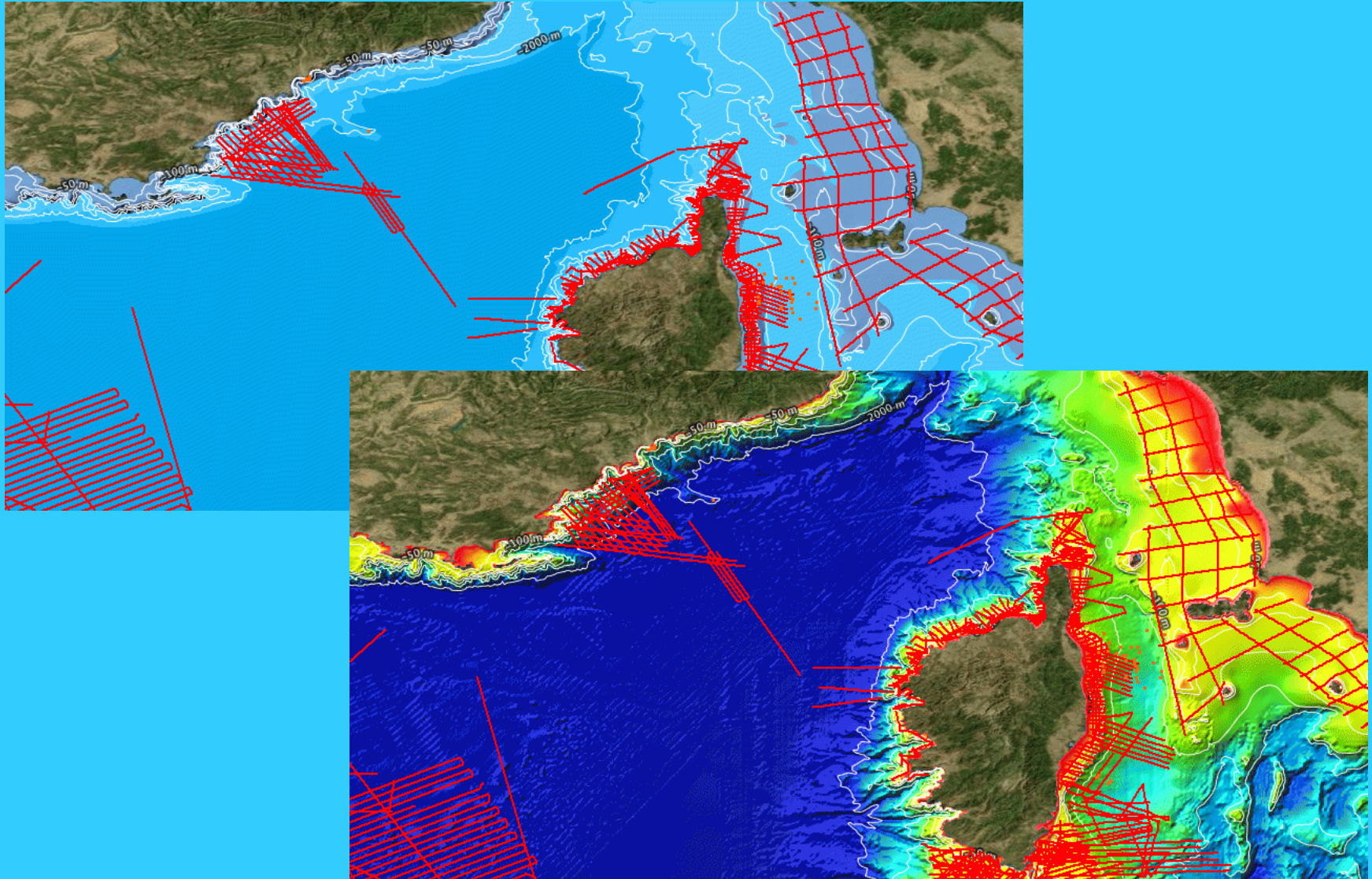
Data SDN format

SeaDataNet CDI Search interface



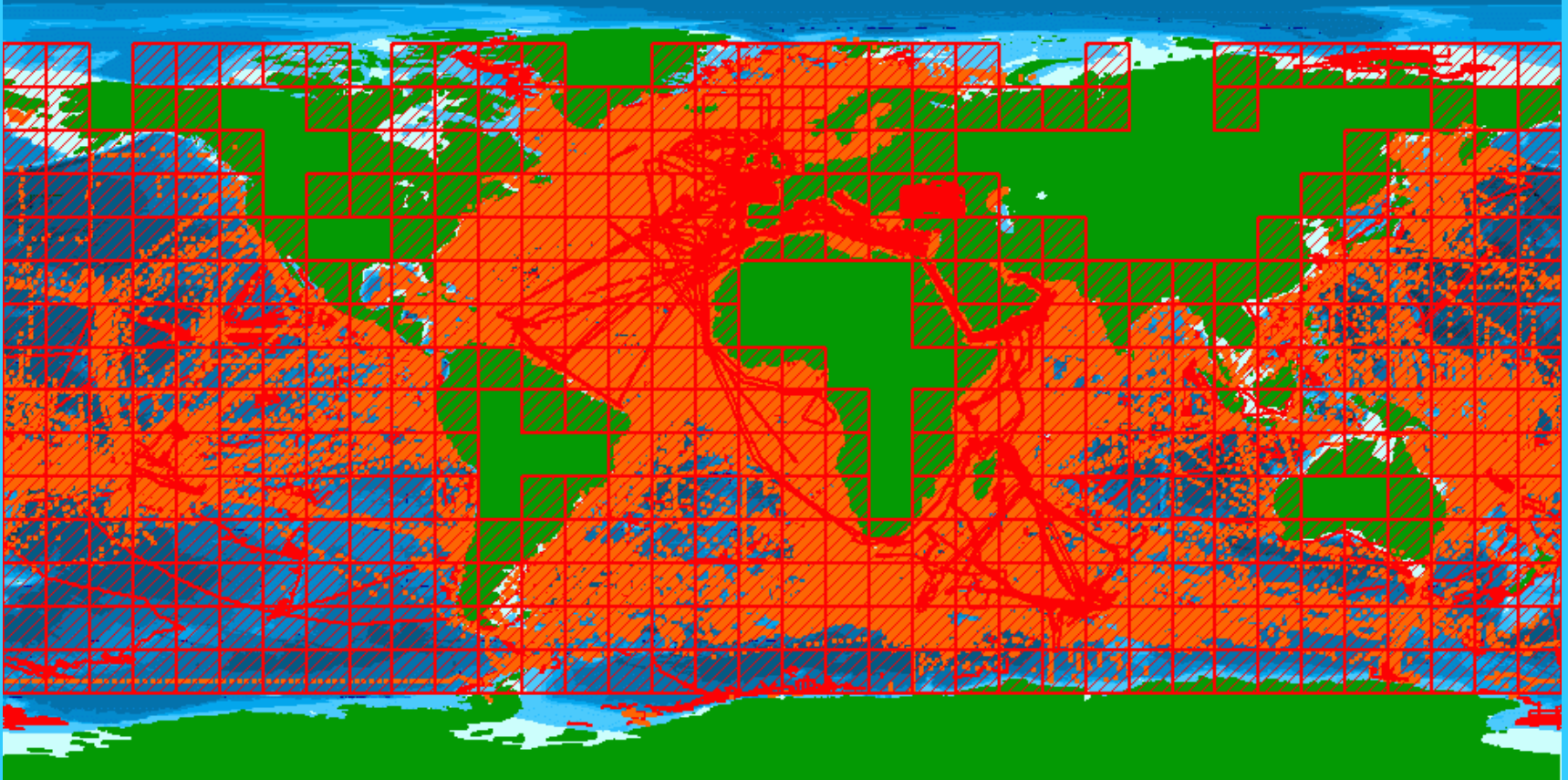
■ Searching for T&S

SeaDataNet CDI Search interface



■ Searching for seismics (EMODNet Bathymetry as WMS layer_

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

European Marine Observation and Data Network



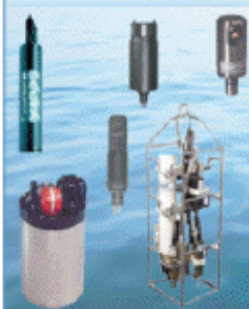
EMODnet



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



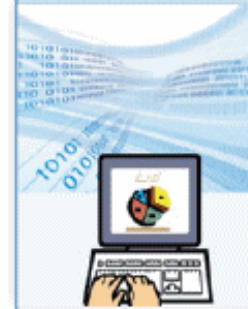
- satcom
- GSM, GPRS
- fibre optics
- acoustics

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 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

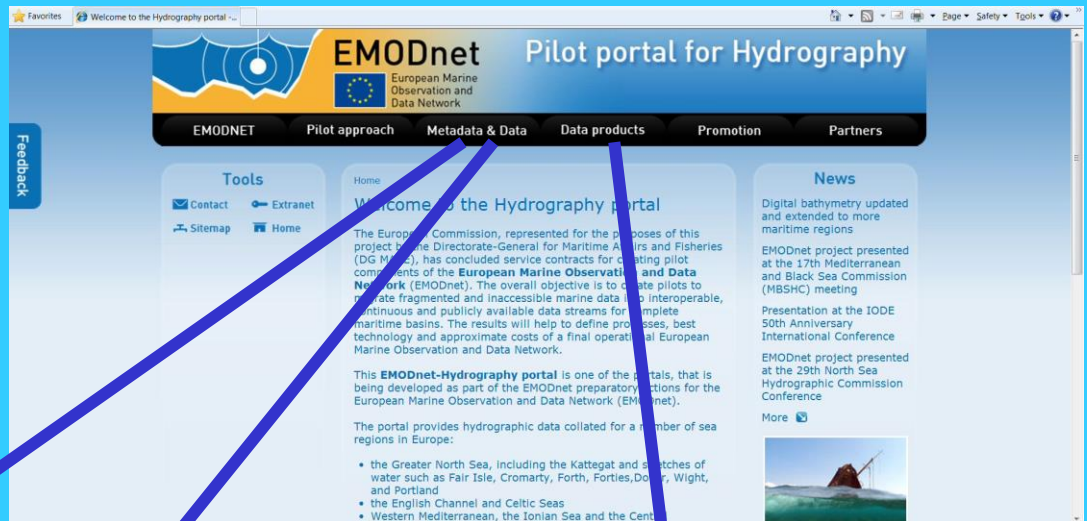
Hydrographic and Seabed Mapping – partnership

- Members of the **SeaDataNet** consortium together with other organisations from marine science, the hydrographic survey community, and industry:
 - **MARIS – NL** (Management, DM and IT expertise)
 - **IFREMER – FR** (Research institute)
 - **GGSGC – NL** (IT expertise, DM hydrography)
 - **IEO – ES** (Research institute)
 - **NERC-NOC – UK** (Research institute)
 - **GSI – IE** (HO – Ireland)
 - **SHOM – FR** (HO – France)
 - **UNEP-GRID Arendal – NO** (International Organisation)
 - **OGS – Oceanography department (IT)** (Research Institute)
 - **HCMR (GR)** (Research Institute)
- Plus Data provider agreements with **HO's from Germany, Norway, Denmark, Netherlands and Belgium**
- Plus Associate partners: **ISMAR-CNR –IT, OGS-RIMA – IT, LNEG – PT, UTM-CSIC – ES, NIOZ - NL** (Research Institutes) + **IHPT – PT** (HO) + **OceanWise (UK)** + **Israeli Government, Ministry of National Infrastructures (Israel)**

EMODNet Hydrography and Seabed Mapping

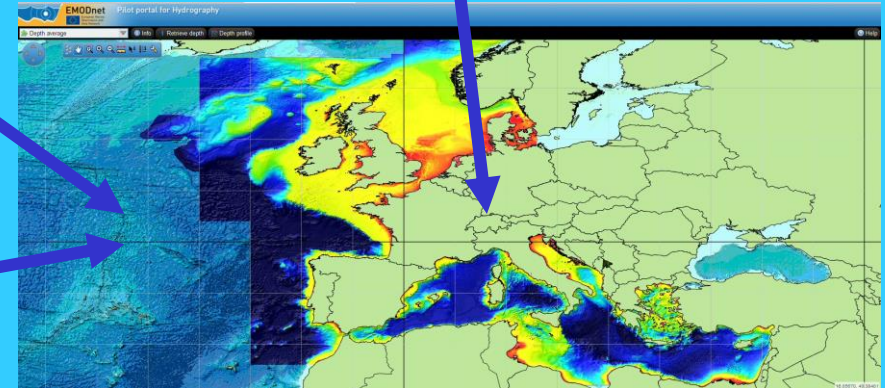
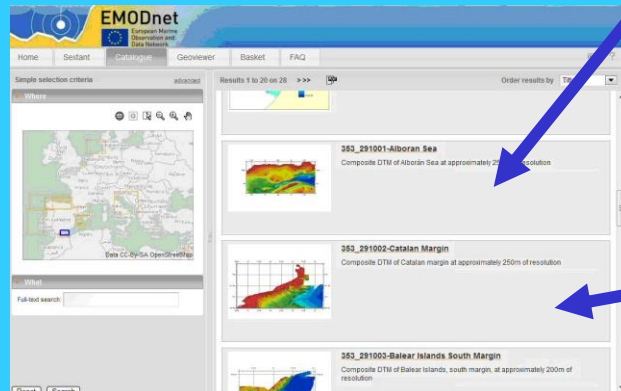
- It aims at compiling an inventory of available bathymetric surveys (plummets, single and multibeam surveys), adopting the SeaDataNet Common Data Index (CDI) infrastructure.
- Also survey data are gathered and processed as input for producing a higher resolution digital bathymetry of 0,25 minute by 0,25 minute for the following sea regions in Europe:
 - the Greater North Sea, including the Kattegat and stretches of water such as Fair Isle, Cromarty, Forth, Forties, Dover, Wight, and Portland
 - the English Channel and Celtic Seas
 - Western Mediterranean, the Ionian Sea and the Central Mediterranean Sea
 - Iberian Coast and Bay of Biscay (Atlantic Ocean)
 - Adriatic Sea (Mediterranean)
 - Aegean - Levantine Sea (Mediterranean).

Hydrographic portal



<http://www.emodnet-hydrography.eu>

CDI metadata service




Data products service

Sextant metadata service


Progress

- Up till today, 8400 survey CDI metadata records from 14 data centres and 114 data originators have been collated and imported into a dedicated EMODnet Hydrography CDI data discovery and access service. This service was launched in May 2010 and has been upgraded over time with extra functionality
- These survey data and other gathered composite DTMs have been collated into regional EMODNet DTM's that are available for viewing and downloading in several formats via the Hydrography Products portal service.
- The dedicated EMODnet Hydrography products portal has been launched in May 2010. It sits atop of the central DTM database and interacts with the CDI service and with OGC WMS services
- Later also the Sextant Data Products service has been added to give metadata about the composite DTMs that have been used next to survey data sets.








CDI Data Discovery and Access Service

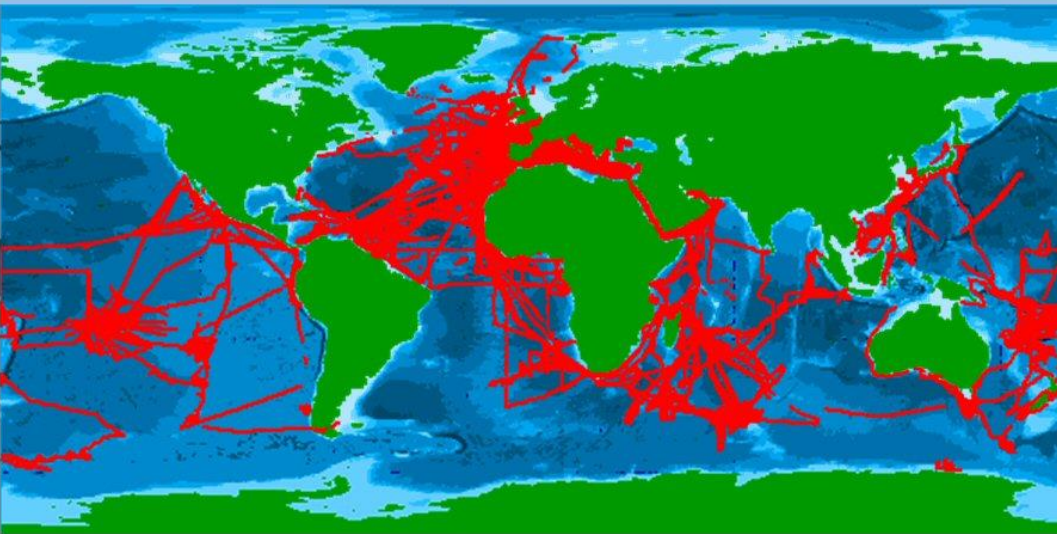
**EMODnet**
European Marine
Observation and
Data Network

Pilot portal for Hydrography
Data Discovery and Access Service

 Cart: **0** Dataset(s) [Proceed to check out](#) [Reset basket](#) [Export](#) [Store query](#) [Summary](#) [Hide map](#) [?](#)

[Reset all steps](#)

Tools ?







[Enlarge](#)
[Position](#)
[Index](#)




Layer control ? [Expand](#) [Add layer](#)
☐ CDI entry Points ?
☐ CDI entry Tracks ?
☐ CDI entry Areas ?

☐ Grid Lines ?
☐ Regional sea ?
☐ Regional sea labels ?
☐ Main sea ?
☐ Main sea labels ?
☒ Bathymetry ?
☐ Blue Marble ?


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

[Zoom to selected](#)

Search by:

Geographical Box


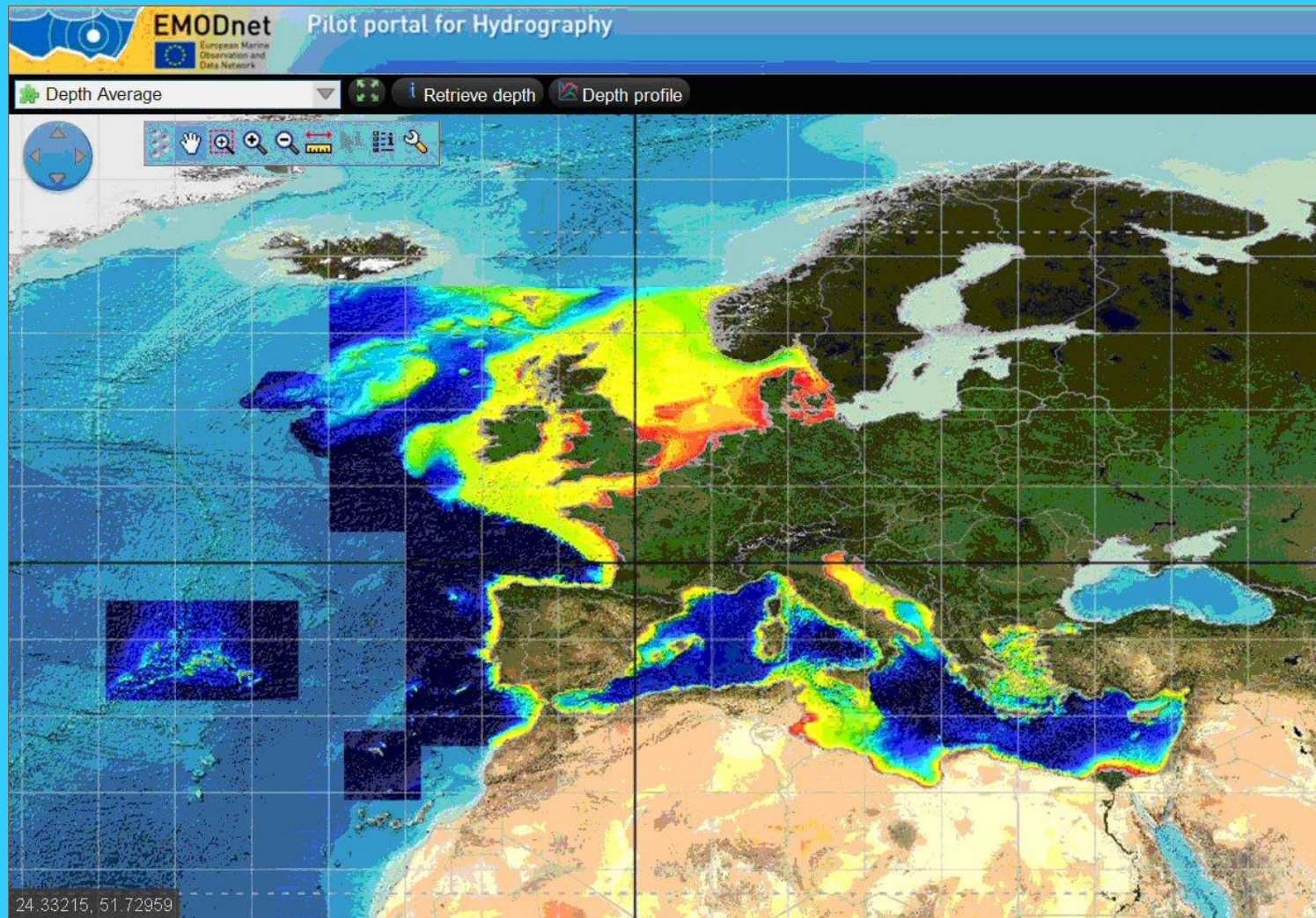
Time period

[Add to basket](#)  ☒ 20 ☐ 50 ☐ 100 Records [Go](#) | Found 7235 | Show (1-20) | Previous | [Next 20](#)

<input type="checkbox"/> #	Data set name ↕	Variables measured	Instrument / gear type ↕ Show
<input type="checkbox"/>	RV Connamara Bathymetry IMAR 2007 Loop Head 5m NetCDF	Administration and dimensions > Administration and dimensions Marine geology > Gravity, magnetics and bathymetry	Differential Global Positioning System receivers, multi-beam echosounders

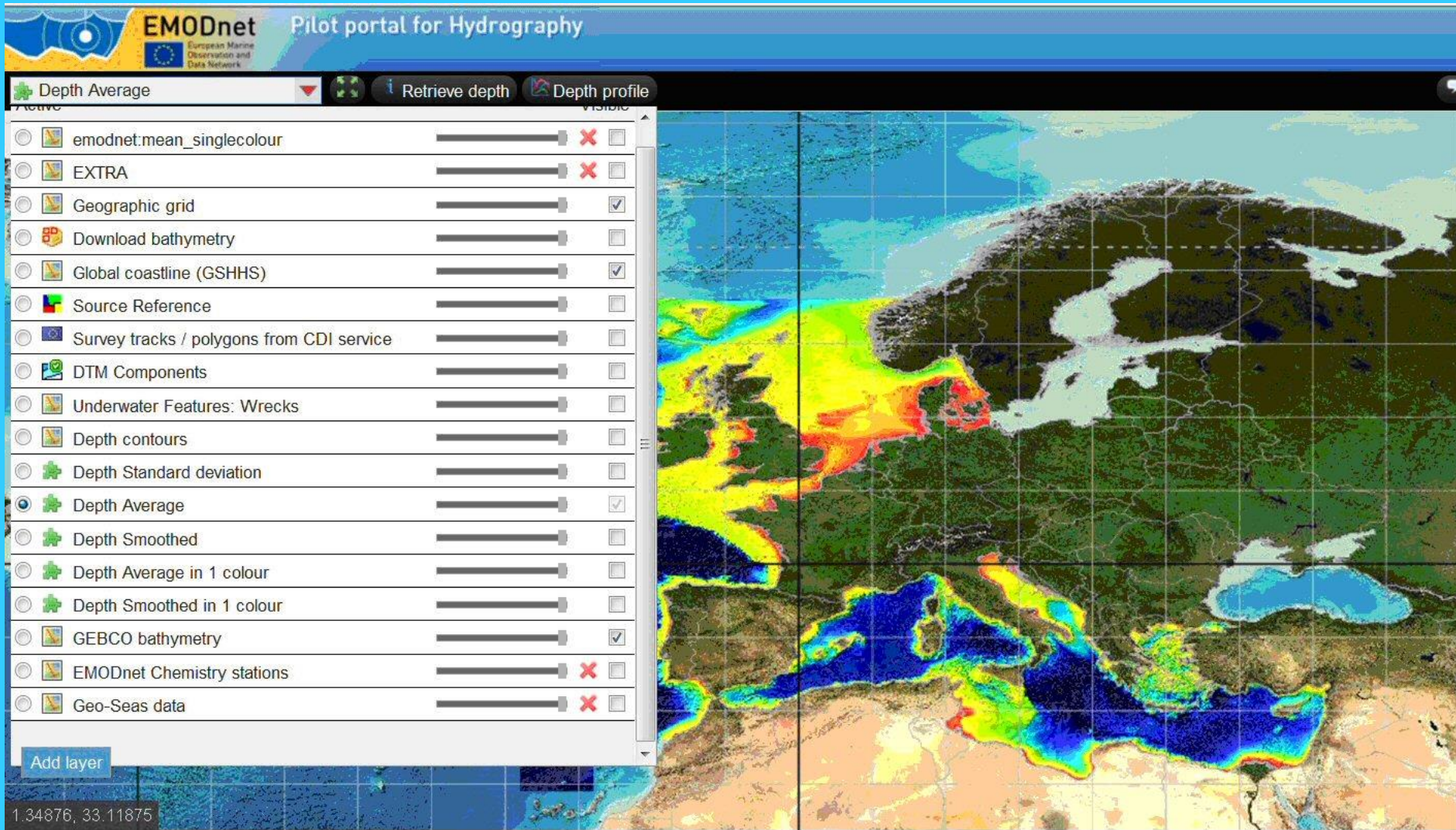
Discovering and requesting access to bathymetric survey data sets (single and multibeam

Hydrographic Data Products viewing service



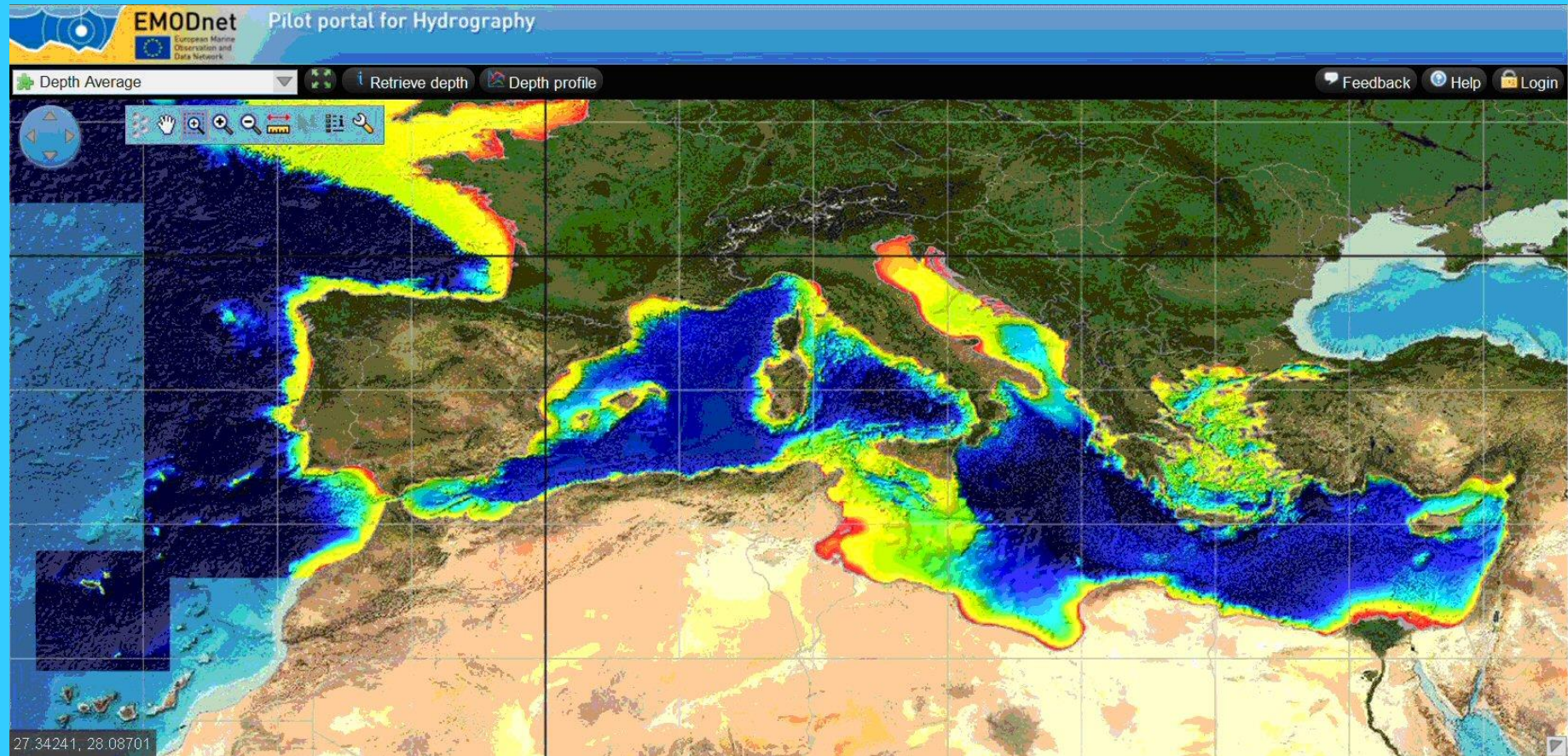
New DTM for European sea basins

Hydrographic Data Products viewing service



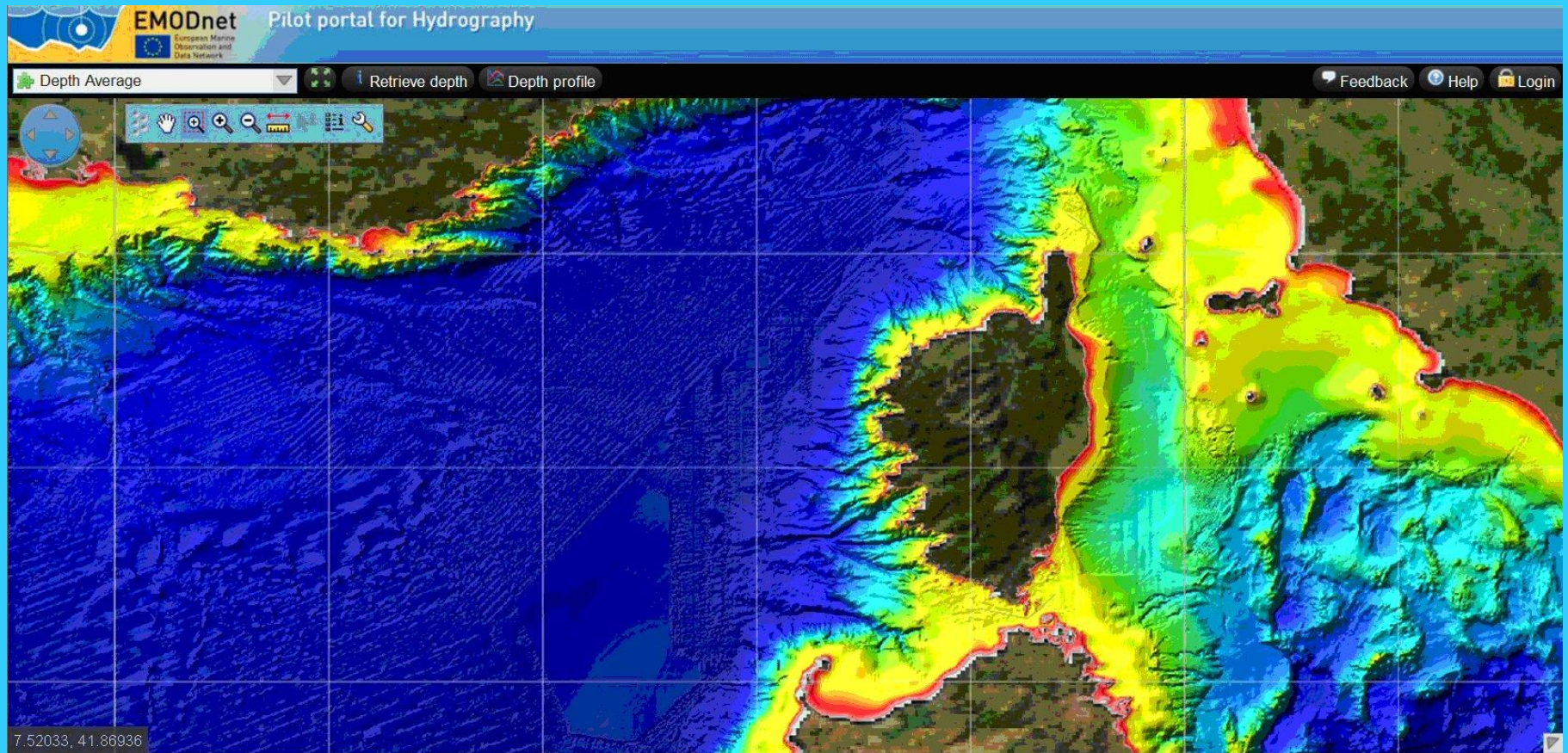
New DTM for European sea basins with layer menu

Hydrographic Data Products viewing service



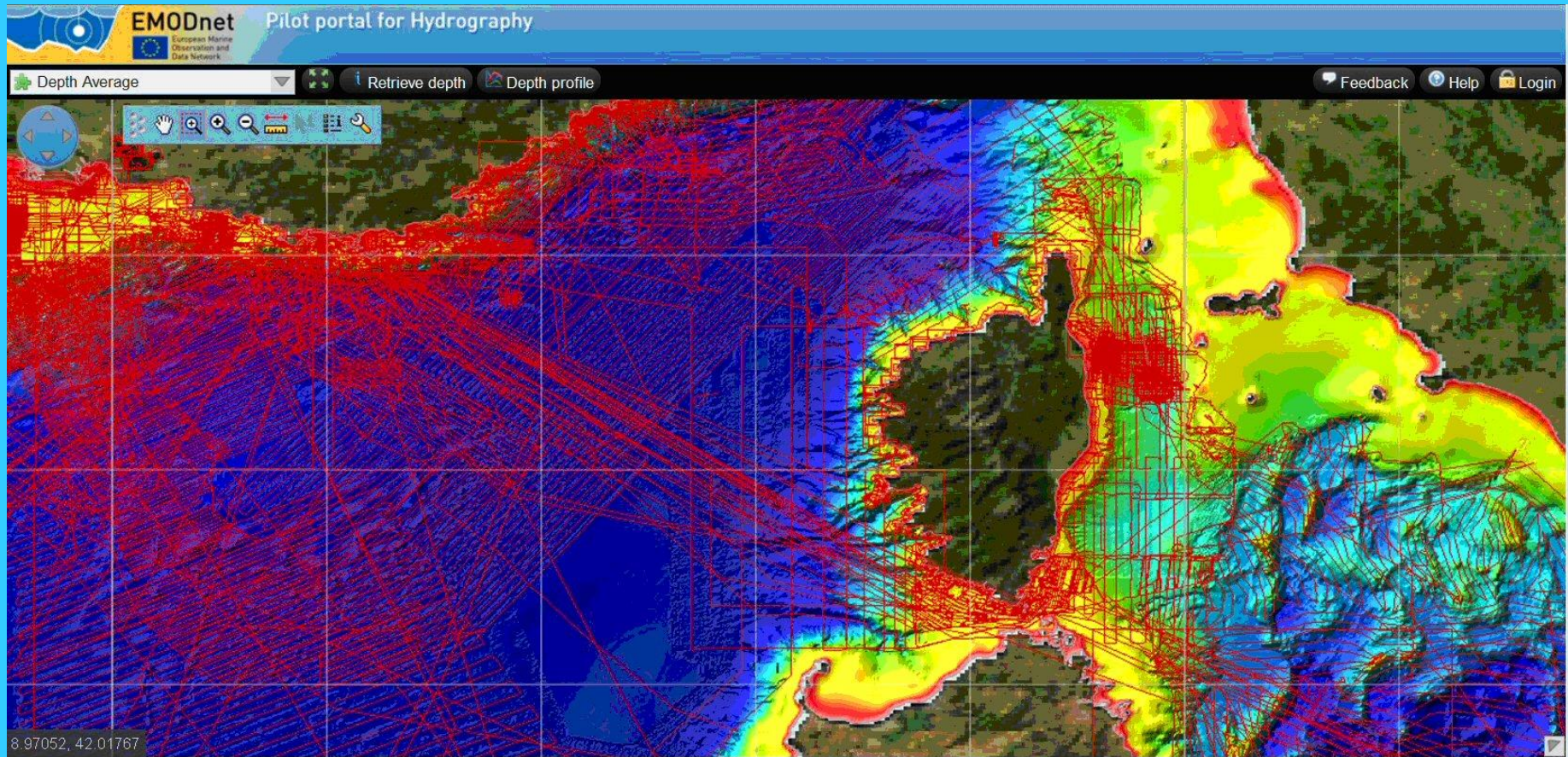
New DTM for European sea basins

Hydrographic Data Products viewing service



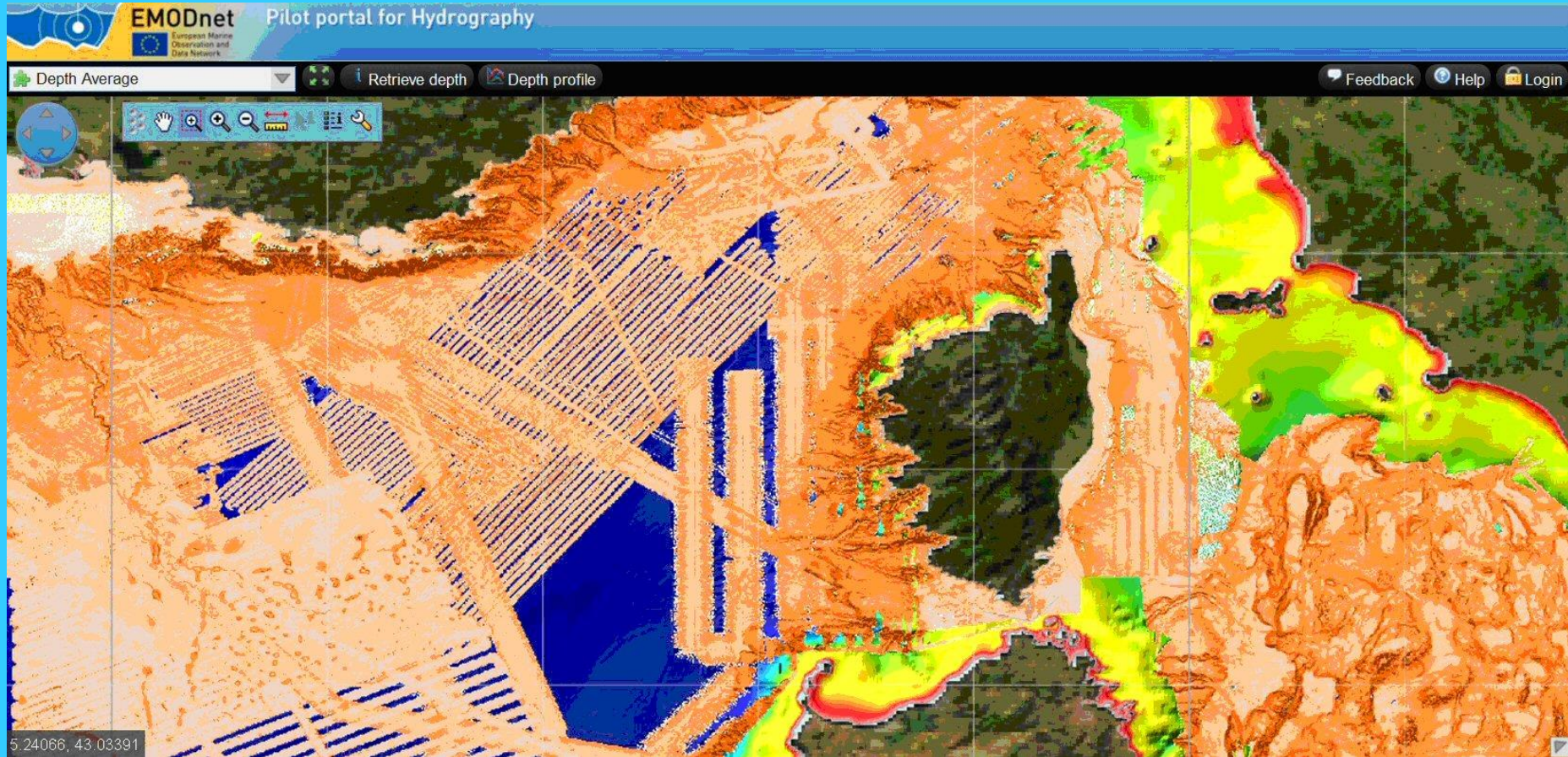
New DTM for European sea basins

Hydrographic Data Products viewing service



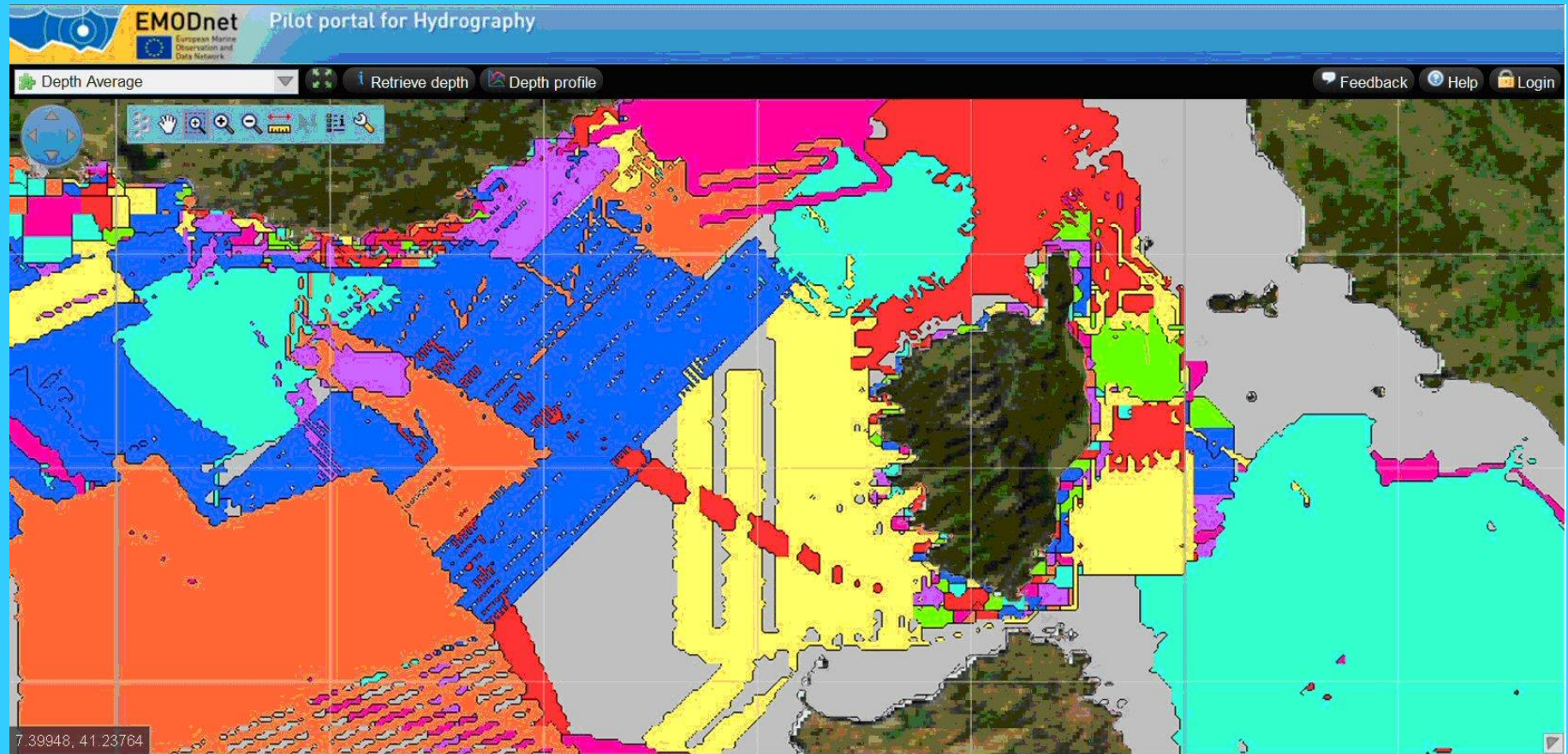
New DTM for European sea basins with CDI overlay to indicate surveys

Hydrographic Data Products viewing service



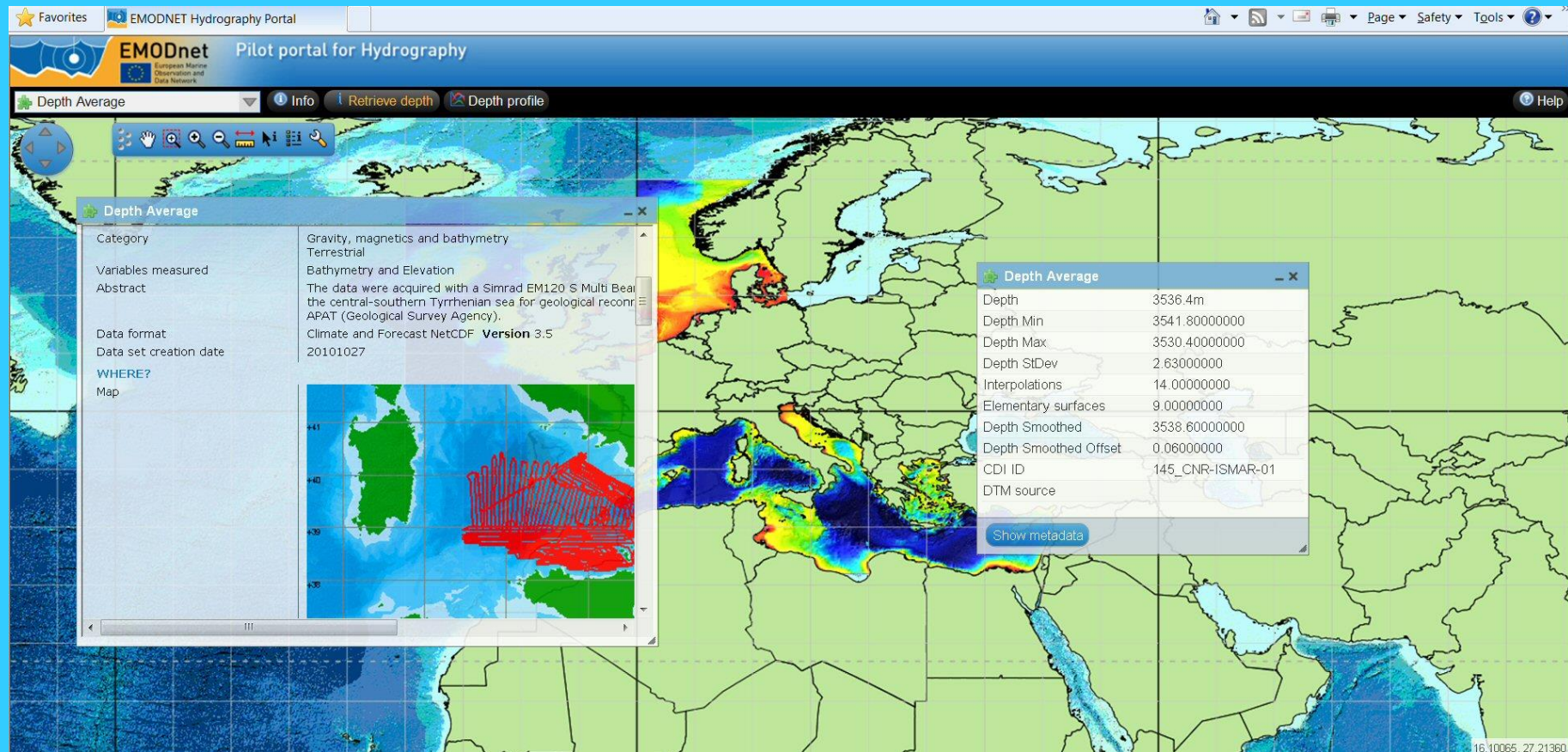
New DTM for European sea basins with waterdepth standard deviation layer

Hydrographic Data Products viewing service



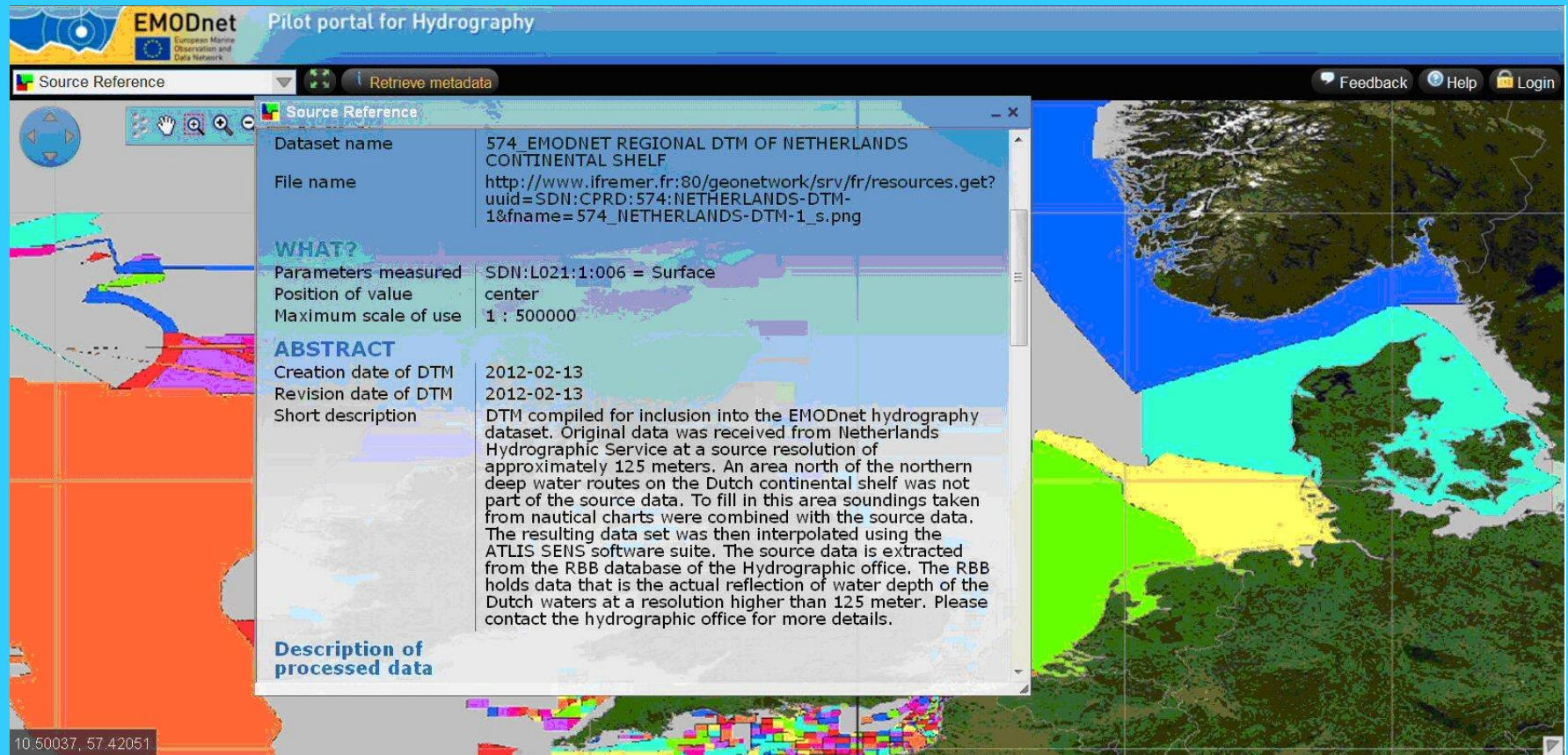
New DTM for European sea basins with sources layer (surveys and composite DTMs)

Hydrographic Data Products viewing service



Retrieving parameters of an individual grid cell and retrieving CDI metadata of associated prevailing survey

Hydrographic Data Products viewing service



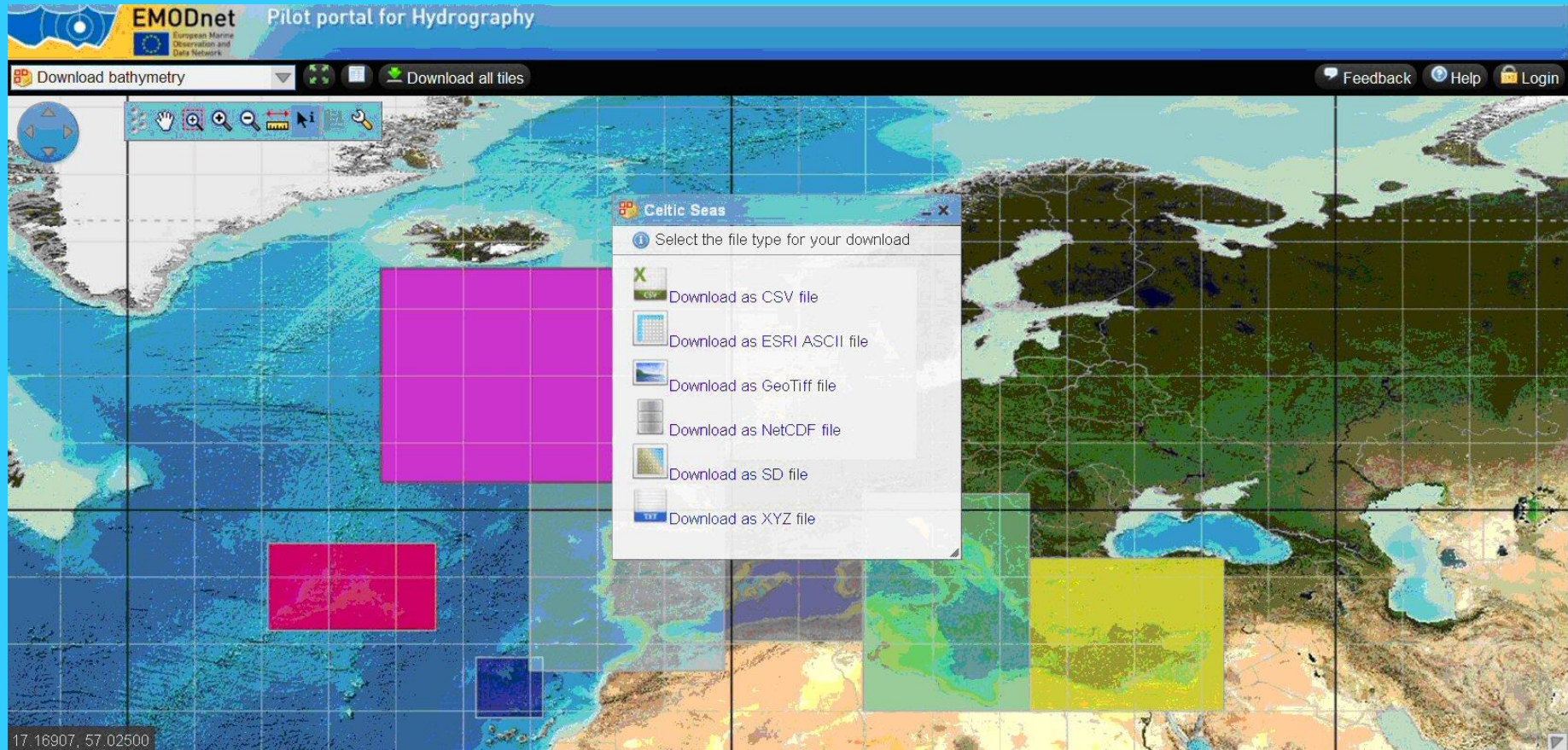
The screenshot displays the EMODnet Pilot portal for Hydrography. A 'Source Reference' window is open, showing metadata for a dataset. The background is a map of the Dutch continental shelf with various colored regions (blue, green, yellow, orange, red) representing different data areas. The window has a 'Source Reference' tab and a 'Retrieve metadata' button. The metadata is organized into sections: 'Dataset name', 'File name', 'WHAT?', 'ABSTRACT', and 'Description of processed data'.

Dataset name	574_EMODNET REGIONAL DTM OF NETHERLANDS CONTINENTAL SHELF
File name	http://www.ifremer.fr:80/geonetwork/srv/fr/resources.get?uuid=SDN:CPRD:574:NETHERLANDS-DTM-1&fname=574_NETHERLANDS-DTM-1_s.png
WHAT?	
Parameters measured	SDN:L021:1:006 = Surface center
Position of value	
Maximum scale of use	1 : 500000
ABSTRACT	
Creation date of DTM	2012-02-13
Revision date of DTM	2012-02-13
Short description	DTM compiled for inclusion into the EMODnet hydrography dataset. Original data was received from Netherlands Hydrographic Service at a source resolution of approximately 125 meters. An area north of the northern deep water routes on the Dutch continental shelf was not part of the source data. To fill in this area soundings taken from nautical charts were combined with the source data. The resulting data set was then interpolated using the ATLIS SENS software suite. The source data is extracted from the RBB database of the Hydrographic office. The RBB holds data that is the actual reflection of water depth of the Dutch waters at a resolution higher than 125 meter. Please contact the hydrographic office for more details.
Description of processed data	

10.50037, 57.42051

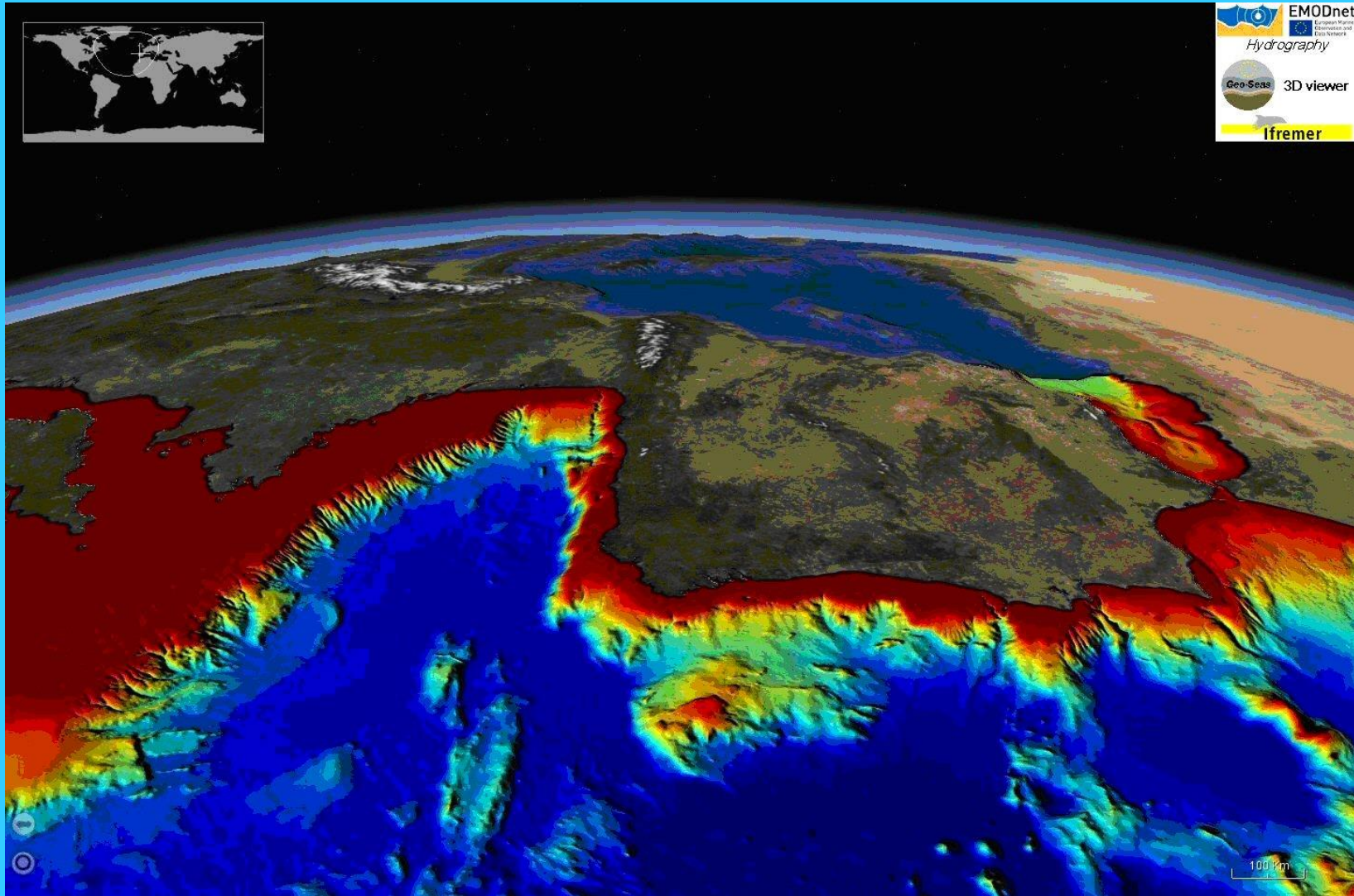
Retrieving Sextant metadata of associated composite DTM

Hydrographic Data Products viewing service



Downloading DTM tiles in a range of formats

Hydrographic DTM – 3D-Viewer



DTM loaded into 3D-Viewer as developed in Geo-Seas

Successful approach

- Providers of bathymetric data sets understand and are welcoming the applied approach:
- Data sets are gathered for internal use by regional consortium groups to compile the DTM product which can be downloaded without any registration
- Data sets are described and included in the CDI Data Discovery and Access Service and composite DTMs in the Sextant Data Products Service.
- Each cell in the DTM product gives information about the data sets used and leads to the CDI / Sextant service for more information about the data provider and options for requesting the data itself
- This works as a shop window and results in more data providers coming forward

EMODNet Bathymetry – new tender

- Increasing the resolution of the DTM from $\frac{1}{4}$ to $\frac{1}{8}$ of a minute of lat – lon (ca 225 m* 225 m)
- Covering missing sea basins:
 - Black Sea
 - Baltic Sea
 - Norwegian + Icelandic Sea
- Including new data sets from existing partners
- Consortium expanded with new partners and associate partners, including GEBCO
- Expected start, June 2013



www.emodnet-hydrography.eu