SeaDataNet has set up and operates a pan-European infrastructure for managing marine and ocean data by connecting National Oceanographic Data Centres (NODCs) and oceanographic data focal points from 34 countries bordering European seas.
**SeaDataNet principles**

- SeaDataNet is **based on a semi-distributed system** that incorporates and enhances the existing NODC network.
- Major technical development activity enables the data centres to interact as a virtual data centre, able to deliver integrated data, meta-data and products of controlled quality **through a unique portal**
SeaDataNet 2 overall objective

to upgrade the SeaDataNet infrastructure as existing at the end of SeaDataNet project (March 2011) into an operationally robust and state-of-the-art Pan-European infrastructure for providing up-to-date and high quality access to ocean and marine metadata, data and data products
SeaDataNet portal: http://www.seadatanet.org

• with harmonised services, products and tools
6 European catalogues maintained by NODCs

SeaDataNet portal provides an overview of the Marine organisations in Europe and their involvement in scientific cruises, data collection, marine projects

- EDMO: European Directory of Marine Organisations
- EDMED: European Directory of Marine Environmental Datasets
- EDMERP: European Directory of Marine Environmental Research projects
- CSR: Cruise Summary Reports
- EDIOS: European Directory of Ocean Observing Systems
- CDI: Common Data Index
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.
CDI service for discovery and unified access of data
### SeaDataNet 2 innovations after 2 years

More data and metadata available, more data centres connected

<table>
<thead>
<tr>
<th>Catalogue</th>
<th>Nb (10/2011)</th>
<th>Nb (09/2013)</th>
<th>Increase</th>
<th>Increase %</th>
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<tbody>
<tr>
<td>EDMO: Marine orgs</td>
<td>2 094</td>
<td>2 384</td>
<td>290</td>
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</tr>
<tr>
<td>CSR: Cruises</td>
<td>32 113</td>
<td>43 687</td>
<td>11 574</td>
<td>36%</td>
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<tr>
<td>EDMED: Data sets</td>
<td>3 813</td>
<td>3 889</td>
<td>76</td>
<td>2%</td>
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<tr>
<td>EDMERP: Projects</td>
<td>2 338</td>
<td>2 698</td>
<td>360</td>
<td>15%</td>
</tr>
<tr>
<td>EDIOS: Programmes</td>
<td>294</td>
<td>356</td>
<td>62</td>
<td>21%</td>
</tr>
<tr>
<td>CDI: Data</td>
<td>1 053 706</td>
<td>1 350 455</td>
<td>296 749</td>
<td>28%</td>
</tr>
<tr>
<td>Connected data centres</td>
<td>65</td>
<td>88</td>
<td>23</td>
<td>35%</td>
</tr>
</tbody>
</table>
**SeaDataNet 2 innovations**

Monitoring of the infrastructure by NAGIOS software for core services centrally based (website, catalogues querying) and for local services (downloading)
**SeaDataNet 2 technical innovations**

Monitoring of the well functioning of the CDI data requesting and downloading process between central portal and connected data centres by ROBOT user, alert mailings and RSM logging of all steps.
**SeaDataNet 2 technical innovations - metadata**

Compliance to INSPIRE by migrating CDI and CSR XML encoding to ISO-19139, adaptation of related tools (XML editor MIKADO, CDI and CSR central discovery services), and adapting to upgraded Vocabularies (NVS2.0)

Abstract metadata model specification
- ✓ SeaDataNet metadata profile of ISO 19115 documentation

XML encoding implementation:
- ✓ Schema definition
- ✓ Schematron rules
- ✓ Sample metadata
- ✓ XML implementation documentation

[www.seadatanet.org/Standards-Software/Metadata-formats](http://www.seadatanet.org/Standards-Software/Metadata-formats)

sdn-userdesk@seadatanet.org – www.seadatanet.org
**SeaDataNet 2 innovations**

Extra Format for data files: **SeaDataNet NetCDF** (CF compliant) for vertical profiles, time series and trajectories, and related tools (NEMO, format converters) – formulated with international community – using Vocabs (NVS2.0), EDMO

http://www.seadatanet.org/Standards-Software/Data-Transport-Formats
SeaDataNet 2 innovations

Improvement of the quality of the data set by

- Duplicate checks
  - within 0.001°, 3 minutes for same instrument types) done on the whole datasets by sea basin and implemented before the loading in the CDI central catalogue

- Format checks
  - total of 14,000 CDIs at ODV format corrected

- QC loop with MyOcean insitu-TAC
  - Aggregated SeaDataNet dataset delivered to MyOcean insitu-TAC for quality checks
  - Automatic QC performed on this aggregated dataset
  - List of errors sent to all NODC
  - 77% of the detected errors (around 14,000 on climatology, spike, visual checks) = ‘True error’ => QC flag changed in SDN dataset
SeaDataNet 2 innovations

- Interoperability with the IOC-IODE Ocean data Portal (ODP): SeaDataNet data can be searched through ODP
SeaDataNet 2 innovations

- Dialogue with potential and existing users of SeaDataNet started: short questionnaire sent to:
  - User panel selected from a small group of people coming from different communities
  - SeaDataNet users having downloaded data sets from the CDI interface
- Some of their suggestions already taken into account (search by sea region, increased number of CDIs per order (500 => 10,000))
- Feedback option on SeaDataNet web site
Cooperation
SeaDataNet 2 cooperation

– For refining and enriching the SeaDataNet standards
– For making the SeaDataNet approach and standards fit for purpose of many different user communities
– For expanding the SeaDataNet infrastructure with more data centres and more volumes of multi-disciplinary data
– For developing added-value services on top of the SeaDataNet infrastructure
– For developing interoperability to other infrastructures
SeaDataNet 2 cooperation with EuroGOOS

– maintaining the European Directory of Ocean observing systems (EDIOS) and quality controlling and archiving long-term data series. See www.edios.org
SeaDataNet 2 cooperation with MyOcean

- for streamlining the provision of long-term archives for optimising marine forecast services; SeaDataNet has an MoU with MyOcean to formalise the cooperation
- Together with EuroGOOS developing the EMODNet Physics portal; streamlining availability and access of NRT and archived metocean data
SeaDataNet 2 cooperation with EuroFleets, POGO and EurOcean

— collecting and providing information on ocean-going research vessels, and their operators, planned and completed cruises.

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SeaDataNet 2 cooperation with EuroFleets

– streamlining the flow of data from the research cruises to the data centre by developing SWE standards and applications
SeaDataNet 2 cooperation with JERICO

- Developing SWE standards and services for Real-Time data flow from fixed monitoring stations
SeaDataNet 2 cooperation with Geo-Seas

- Adopting and adapting SeaDataNet standards and infrastructure for discovery and access to geological and geophysical metadata, data and data products

HR seismic viewing services and software package for lithological log visualisation and 3D viewer
SeaDataNet 2 cooperation with Micro-B3

- aims for a better understanding of the complexity of marine microbial communities and their role in climate change.

- data sets and information on marine organisms and genes need to be complemented with their environmental context ......

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**SeaDataNet 2 cooperation UBSS and CaspInfo**

- Marine Data Management capacity building and expanding the SeaDataNet infrastructure for the Black Sea and Caspian Sea regions
SeaDataNet 2 cooperation with GEOSS

• Populating the GEOSS portal via the EuroGEOSS Brokerage service
SeaDataNet 2 and EMODNet

- EU has adopted the Marine Directive and Maritime Policy.
- The Commission proposed to take steps towards an overarching European Marine Observation and Data Network (EMODNet).
- The initial Roadmap for EMODNet was released in April 2009.
- A cost–benefit analysis reveals that the cost of marine observation in Europe is circa 400 Million Euro per year for space data and another 1 Billion Euro per year for in-situ data => better availability and access can give benefits of at least 300 Million Euro per year for industry, research, government and public.
a network of existing and developing European observation systems, linked by a data management structure covering all European coastal waters, shelf seas and surrounding ocean basins, accessible to everyone
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<tr>
<td>Phase 1</td>
<td><strong>limited sea basins</strong></td>
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<td>Phase 2</td>
<td><strong>low resolution</strong></td>
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<tr>
<td>Phase 3</td>
<td><strong>multi-resolution</strong></td>
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</table>

**PROTOTYPING:**

allows users to assess and improve product by trying it out
SeaDataNet 2 and EMODNet

- Preparatory actions were launched for phase 1 2009 – 2011 followed by phase 2 2012 – 2014.
- Concern setting up and further developing portals to provide data products services for data themes over a number of maritime basins:
  - Geology, Chemistry, Biology, Hydrography, Marine Habitats, Physics
- Overall SeaDataNet has qualified itself as leading infrastructure for the EMODNet data management component and is driving several preparatory projects
Viewing service with downloadable digital bathymetry (DTM – 450 m grid) and overlay of CDI survey data sets
Discovering and requesting access to bathymetric survey data sets (single and multibeam) (9100+)
EMODNet Bathymetry

3D software developed as part of Geo-Seas to visualise the EMODNet Digital Bathymetry
Viewing service for Nitrate distribution in the Balearic spot with overlay of CDI data sets
CDI Service as common service in many projects

SeaDataNet

IMDIS Conference, Lucca, Septembre 23-25, 2013

www.geo-seas.eu
www.emodnet-chemistry.eu
www.blackseascene.net
www.emodnet-hydrography.eu
www.emodnet-physics.eu

sdn-userdesk@seadatanet.org – www.seadatanet.org
www.caspinfo.net
> 1,35 million CDI entries from 29 countries and 88 data centres and 435 originators for physics, chemistry, geology, geophysics, bathymetry and biology; years 1800 – 2013; 90% unrestricted or under SeaDataNet licence
SeaDataNet 2 - international

• Ocean Data Interoperability Platform (ODIP):
  – Europe (EU support)
  – USA (NSF support)
  – Australia (Gov support)
  – IOC-IODE (EU support)
  – Workshops for seeking common standards and interoperability solutions

• Ocean Data Portal (ODP) – UNESCO IOC-IODE:
  – Interoperability solutions for populating the Ocean Data Portal (ODP) in a structure way from the European marine data infrastructure

• Ocean Data Standards – UNESCO IOC-IODE:
  – Seeking global standards and promoting best practice

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SeaDataNet 2 – challenges coming years

• Improve capability for handling also marine biological data in close cooperation with EurOBIS, MarBEF, EMODNet Biology, Micro-B3 and LifeWatch initiatives

• Further developing and implementing Machine to Machine interfacing and interoperability
  – towards other infrastructures for metadata, data and product distribution
  – Towards added-value services by means of Work Flow processes (cloud computing)

• Further implementing SWE standards and services

• Establishing a governance structure for SeaDataNet with sustainable perspective, also in dialogue with EMODNet development

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Have a very interesting and pleasant IMDIS Conference