Introduction to SeaDataNet infrastructure

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Oceans and seas are important

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

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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

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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.

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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

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Centralised metadata directories

EDMERP
Projects

EDIOS
Observing programmes

CDI
Data index

CSR
Research cruises

EDMED
Data sets
CDI Data Discovery and Access service

SeaDataNet portal

European data sources
- data centres $\approx 650$ originators

Search and Shop

Data centres

Metadata + transaction data

Already 110 data centres connected and more underway

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CDI Data Discovery and Access service
Data Products and viewers

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.
SeaDataNet cooperation

- **Copernicus Marine Environmental Monitoring Services (CMEMS):** providing long-term archives and standards
- **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
- **Ocean Data Interoperability Platform (ODIP):** exploring and demonstrating common standards and interoperability with leading data management infrastructures in USA and Australia
- **GEOSS - EuroGEOSS:** Maintaining the GEOSS portal with SeaDataNet in-situ data collections from large community of European data holders (> 100 data centres; >600 data originators)
- **European Open Science Cloud (EOSC):** shaping the pilot Blue Cloud
- **European Marine Observation and Data Network (EMODNet) driven by Marine Knowledge 2020 and Blue Growth**
SeaDataCloud a new opportunity

Standards and information technology are always evolving, and the SeaDataNet infrastructure must stay up-to-date to maintain and further expand its services to its leads customers and major stakeholders.
SeaDataCloud - Key numbers

- 4 year duration, started 1\(^{st}\) November, 2016
- 10 M euros
- 56 partners
- 5 subcontractors
- 32 countries
- 1110.5 man/months
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
- Moreover, it is about implementing 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

5 EUDAT members are partners of SeaDataCloud:
CINECA, CSC, DKRZ, GRNET and STFC
Architecture upgrading

Present SeaDataNet architecture

Planned upgraded architecture with data replication, advanced services and VRE in the cloud