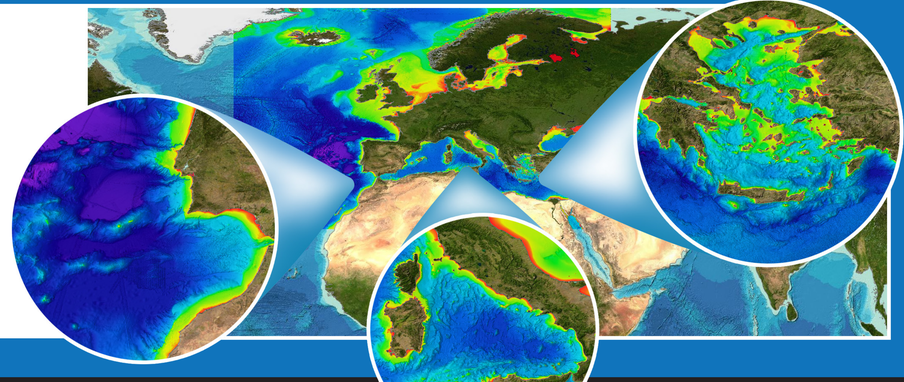
EMODnet

European Marine Observation and Data Network



EMODNET HYDROGRAPHY – SEABED MAPPING – BATHYMETRY PROJECTS

PRODUCING A HIGH RESOLUTION DIGITAL BATHYMETRY FOR EUROPEAN SEA BASINS

In December 2007 the European Parliament and Council adopted the Marine Strategy Framework Directive (MSFD) which aims to achieve environmentally healthy marine waters by 2020. This Directive includes an initiative for an overarching European Marine Observation and Data Network (EMODnet).

The EMODnet Hydrography - Seabed Mapping - Bathymetry projects made very good progress in developing the EMODnet Bathymetry portal to provide overview and access to available bathymetric survey datasets and to generate an harmonised digital bathymetry for Europe's sea basins. Up till February 2016 more than 13.500 bathymetric survey datasets, managed by 27 data centres from 14 countries and originated from 167 institutes, have been gathered and populated in the EMODnet Bathymetry Data Discovery and Access service, adopting SeaDataNet standards. In addition a number of data providers have delivered composite DTMs as alternative to survey data sets and these are populated with metadata in the EMODnet Sextant Catalogue service. From these circa 7000 survey data sets and 30 composite DTMs together have been used as input for analysing and generating the EMODnet digital terrain model (DTM), for the following sea basins:

- 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 and Central Mediterranean Sea and Ionian Sea
- Bay of Biscay, Iberian coast and North-East Atlantic
- Adriatic Sea
- Aegean - Levantine Sea (Eastern Mediterranean)
- Azores - Madeira EEZ
- Canary Islands
- Baltic Sea
- Black Sea
- Norwegian – Icelandic seas

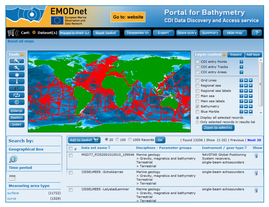


Figure 1: CDI Data Discovery and Access Service - overview of selected survey data sets

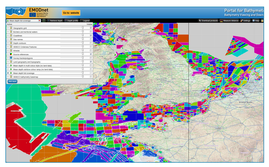


Figure 2: Bathymetry Viewing and Download service - layers menu and layer indicating data sources used for the resulting DTM

Gaps in coverage by survey data sets and composite DTMs are completed by using the GEBCO – 2014 DTM data. GEBCO (General Bathymetric Chart of the Oceans) is partner in the project, while for the Baltic Sea synergy takes place with the Baltic Sea Bathymetry Database project of the Baltic Sea Hydrographic Commission.

The Bathymetry Viewing and Download service gives users wide functionality for viewing and downloading the EMODnet digital bathymetry:

- water depth in gridded form on a DTM grid of 1/8 * 1/8 arc minute of longitude and latitude (ca 230 * 230 meters)
- option to view depth parameters of individual DTM cells and references to source data
- option to download DTM in 16 tiles in different formats: ESRI ASCII, XYZ, EMODnet CSV, NetCDF (CF), GeoTiff and SD
- option for users to create their Personal Layer and to upload multibeam survey ASCII datasets for automatic processing into personal DTMs following the EMODNet standards
- layer with a number of high resolution DTMs for coastal regions
- layer with wrecks from the UKHO Wrecks database.

The NetCDF (CF) DTM files are fit for use in a special 3D Viewer software package which is based on the existing open source NASA World Wind JSK application. It has been developed in the frame of the EU FP7 Geo-Seas project (another sibling of SeaDataNet for marine geological and geophysical data) and is freely available. The 3D viewer also supports the ingestion of WMS overlay maps. The SD files can also be used for 3D viewing by means of the freely available iView4D (Fledermaus) software.

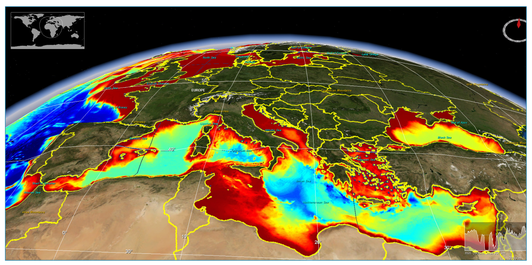


Figure 3: 3D Viewer - example view for the EMODnet DTM

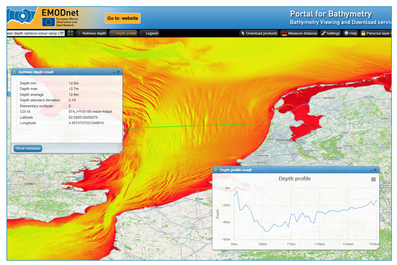


Figure 4: Bathymetry Viewing and Download service - example for retrieving depth and depth profile

A new release of the EMODnet DTM is planned for summer 2016 integrating more data sets and refining areas with possible anomalies. The EMODnet consortium is actively seeking cooperation with additional Hydrographic Offices, research institutes, authorities and private organisations for more data sets (single and multi-beam surveys, sounding tracks, composite products) to contribute to an even better geographical coverage. These datasets will be used for upgrading and extending the EMODnet DTM. The datasets themselves are not distributed but described in the metadata services, giving clear information about the background survey data used for the DTM, their access restrictions, originators and distributors and facilitating requests by users to originators. This way the portal provides originators of bathymetric data sets an attractive shop window for promoting their data sets to potential users, without losing control.

VISIT US AT:

WWW.EMODNET–BATHYMETRY.EU

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SeaDataNet

Eurofleets

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The project

The EU FP7 funded Eurofleets2 project (2013 – 2017) concerns the European fleet of Research Vessels and aims at developing a common strategy and at establishing a pan-European distributed infrastructure. The European fleet of research vessels can be considered as a unique distributed infrastructure really competitive with its international counterparts as the US fleet. Research vessels represent very expensive assets with high development, investment, operation, maintenance and implementation costs. A continued investment flow is vital to maintain and possibly increase Europe's research capacity. Research vessels are necessary for marine science to maintain observation systems (biogeochemistry, physics...), to monitor oceanographic parameters, to deploy sophisticated equipments in the deep sea, to carry out specific observation missions and to collect rare and sensitive biological samples. Their role is expanding with the development of in-situ operational observation (moorings, floats, gliders, seabed observatories...).

A high availability of oceanographic fleets and associated marine equipment and a coordinated strategy and access to facilities are essential for a high quality of the research at sea.

Innovation promotion and fostering partnerships with industry

This is a major project objective and aims at:

- Establishing a regular dialogue with industrial organizations as providers and users;
- Exploring opportunities for technology transfer and innovation between Eurofleets2 project and industry;
- Implementing and evaluating a number of potential business cases;

Opportunities for technology transfer are provided by 2 RTD work packages:

1. Regional RVs guidelines and generic designs;
2. Software and Tools

1 Regional RVs guidelines and generic designs

Aims to achieve a more efficient and competitive European fleet in the field of RRV (Regional Research Vessels). This requires a modern fleet in terms of its conception and design, able to provide the capability for multipurpose and interoperability of sea operations, taking also into account the great variety of the bathymetric charts of different regions of the Mediterranean Sea. For this reason, design and development of RRVs is a complicated, time consuming and expensive exercise, and it should be done by establishing regular exchanges / contacts between qualified ship design companies, equipment manufacturers, scientific personnel with long experience from marine research cruises and experienced research vessel operators in order to build on "best practice" from existing RRVs together with the latest developments in ship design and scientific equipment. In order to concentrate all experiences, ideas and knowledge regarding the regional research vessels, the purpose of this work package is to develop generic basic designs based on guidelines for ship design for sea operations. Work so far has resulted in specifications and guidelines for Regional Research Vessels concerning:

- Noise and vibration reduction, environmental footprint;
- Bubble sweep down avoidance;
- Work deck installations associated to sea operations procedures and interoperability

Transfer to industry:
Targets: shipyards and ship design companies involved in oceanographic research vessels

Aim: to establish a dialogue and knowledge transfer which will be beneficial both for the industry parties as well as for their clients, operators and managers of research vessels

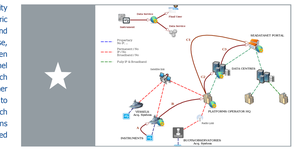
Approach: Started with inventory of shipyards and ship designers in Europe; Next will be a Workshop with project partners and selected industry parties to present and discuss outcomes of the research activities and to explore common grounds.

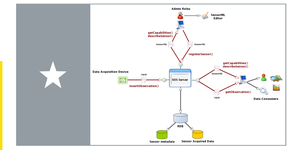
2 Software and Tools

Central topic is the development and implementation of a shipborn data management system to support data acquisition, standard logging of vessel and scientific cruise information, and transfer of acquired data and metadata from the research vessels to onshore data centres, thereby adopting common standards such as from ISO, OGC and SeaDataNet and seeking interoperability with other research vessel initiatives such as R2R in the USA. One of the major activities is upgrading and making the earlier prototype of the EARS system (Eurofleets Automatic Reporting System) for manual and automatic event logging operational.

Sensor Web Enablement (SWE):

A very innovative activity is aimed at standardisation of the data acquisition process by using OGC Sensor Web Enablement (SWE) technologies. This facilitates streamlining the flow of metadata and data from sensors through the shipborn data acquisition and management system to onshore data centres. It includes defining and implementing SensorML and Observation & Measurements (O&M) profiles for specific instruments (including navigation). These profiles are supported by SeaDataNet controlled vocabularies and will provide access to the acquired data by means of the OGC Sensor Observation Service (SOS).





Transfer to industry:
Targets: manufacturers of sensors such as oceanographic and navigation equipment.

Aim: to involve them as sounding board and moreover as partners in development thereby striving for industry adoption of the SWE standards. Adoption for commonly used instruments by manufacturers will pave the way towards delivery of plug-and play instruments. Observation network and research vessel operators will then be able to plug new instruments into their acquisition systems and to receive standardised and harmonised output.

Approach: Cooperation and tuning with various other EU projects and also in the USA and Australia that are making progress to adopt SWE and develop standards.

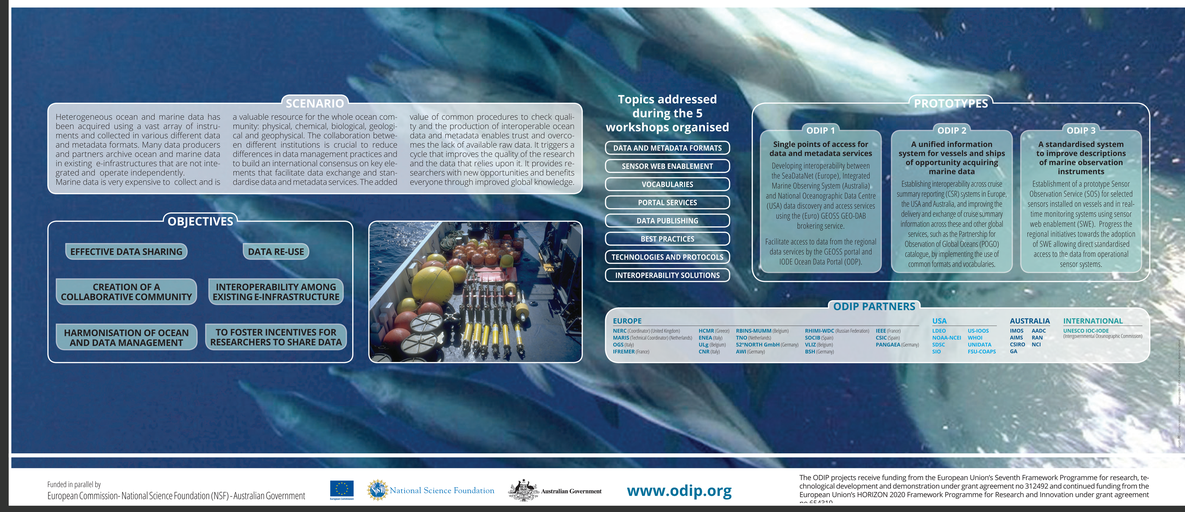
Joint SWE Workshop at OI2016: 17 March 2016, from 13.30 to 17.00 hours, Room 6 South Gallery
An overview will be given of the present state of developments by means of a few concise presentations. In addition manufacturers of instruments and platforms will be invited for sharing their views on adoption of SWE standards. Furthermore a panel discussion will be included. This should lead to a fruitful dialogue for finetuning SWE standards in the near future.

Visit www.eurofleets.eu

OCEAN DATA INTEROPERABILITY PLATFORM

EU SEVENTH FRAMEWORK PROGRAMME (FP7) - CONTRACT Nº 312492 - EU HORIZON 2020 FRAMEWORK PROGRAMME CONTRACT Nº 654310

Activity: International co-operation with the USA and Australia on common e-infrastructure for marine data



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