EMODnet High Resolution Seabed Mapping – further developing a high resolution digital bathymetry for European seas

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EGU 2017, Vienna - Austria, April 2017
EU communication “MARINE KNOWLEDGE 2020 - marine data and observation for smart and sustainable growth” promotes ‘capture once – use many times’

The EU Blue Growth communication considers ocean and marine data as important input for driving scientific and economic developments.

Initiative by EU DG MARE in 2008 for EMODnet:

Focus on generic European marine data products for different domains: bathymetry, geology, biology, chemistry, physics, seabed habitats, coastal mapping, and human activities.
SeaDataNet core partner in developing and building: European Marine Observation and Data Network

Resulting in uptake of SeaDataNet standards and expansion of the infrastructure of data centres giving data overview and access

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EMODnet Bathymetry

- Ongoing in 4 consecutive projects since 2009 with expanding consortium

- Consortium consisting of bathymetric and IT experts and data providers from National Hydrography Services, marine research institutes and SME’s, and GEBCO

- **Overall objective**: to bring together bathymetric surveys of European seas and to produce, publish and serve a harmonised and high resolution Digital Terrain Model of all European seas
Process flow and services

Adoption of SeaDataNet standards and services

Common method and software (Globe) used by all data providers and regional sea coordinators
Common Methodology

From local data to regional DTMs to EMODnet DTM
Use of GLOBE software

Norwegian and Icelandic seas – Arctic – example
Regional DTM production, including GEBCO for gaps – example Atlantic near Iberian peninsula

Average depth for the interpolated DTM (using survey data & CDTM’s)

Resulting DTM with average depth after GEBCO integration and smoothing
**Data gathering results**

- Up till today, **14791** survey CDI metadata records from **27** data centres and **166** data originators **from 1816 to 2016** have been collated and imported into the dedicated EMODnet Bathymetry CDI data discovery and access service.

- The SeaDataNet Data Products Catalogue service (Sextant) gives **78** metadata records about composite DTMs that have been used next to survey data sets.
Bathymetry Viewing and Download service with EMODnet DTM

http://www.emodnet-bathymetry.eu
Layer with CDI data references

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Oceanographic geographical features

The data were acquired with a Simrad EM120 S Multi Beam echosounder aboard the Russian R/V Gelendzhik in order to cover the central-southern Tyrrhenian sea for geological reconnaissance in the framework of an Italian project funded by CNR and APAT (Geological Survey Agency).

**Climate and Forecast NetCDF**  
**Version 3.5**

20101027
Layer with source references of used data sets and their coverage

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Download DTM in tiles in various formats

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Bathymetric DTM – 3D-Viewer

DTM loaded into 3D-Viewer as developed and freely downloadable, based upon NASA World Wind software

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Bathymetric DTM – 3D-Viewer

DTM near Sicily loaded in 3D-viewer

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GEBCO – General Bathymetric Chart of the Oceans (IHO – IOC) and EMODnet Bathymetry DTM – example in Tyrrhenian Sea near Sicily – Italy and South Italy – resolution EMODnet is 16 times higher
**Key indicators**

- The number of visitors to the Bathymetry portal has increased during the project from circa 18,500 over the first year to circa 32,500 over the second year and to circa 42,000 over the third year.
- Number of downloaded DTM tiles went from 22,400 in the first year to 40,800 tiles in the third year.
- Uptake by major users such as energy companies, dredging companies, modellers and many others.

![No of Survey Datasets per year](chart.png)
EMODnet Bathymetry – next phase started: HRSM

- Expanding partnership to include more data providers

- 41 collaborating organisations
- 20 countries
- 16 Hydrographic Offices
- 17 Marine Research Institutes
- Over 70 specialists
- Strong relations with major national and international bodies (IHO, GEBCO, NOAA, National research agencies, National marine and environmental agencies, ...)

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**EMODnet Bathymetry – next phase started:**

**HRSM**

- Expanding North to polar area, including the Barents Sea and synergy with IBCAO

- Expanding DTM including coastal areas

- Increasing overall resolution to 1/16 arc minute and inserts of higher resolution where possible and provided

- Including alternative data sources (Satellite Derived Bathymetry)
EMODnet Bathymetry – next phase started

Innovation:

• Upgrading of the portal and adding extra functionalities to the viewing portal such as more delivery options, 3D viewing in the browser, versioning of DTMs with DOIs

• Latest DTM uses > 7,700 survey data sets and composite DTMs from 31 data providers from 18 countries and GEBCO_2015

• Latest DTM contains 1,092,115,678 data points (28,799 rows x 37,922 columns)

⇒ Reaching the limit => developing cloud process and VRE around GLOBE for higher performance of computations and improved quality by more interaction between regions and extra viewing and qc services
EMODnet Bathymetry – next phase started: HRSM

- Determining best European coastline, also using European tidal model for vertical referencing
- International cooperation with GEBCO, IBCAO, IHO, NOAA and others
EMODnet Bathymetry – next phase started
www.emodnet-bathymetry.eu

http://doi.org/10.12770/c7b53704-999d-4721-b1a3-04ec60c87238