

# EMODnet Bathymetry

SBD Day, Herrsching



Schmitt Thierry (SHOM)  
Knut Hartmann (EOMAP)  
Benoit Loubrieu (Ifremer)  
Vivi Drakopoulou (HCMR)  
Sandra Aguilar, Martin Verlan  
(Deltares)  
Dick Schaap (MARIS)

All the EMODnet HRSM consortium

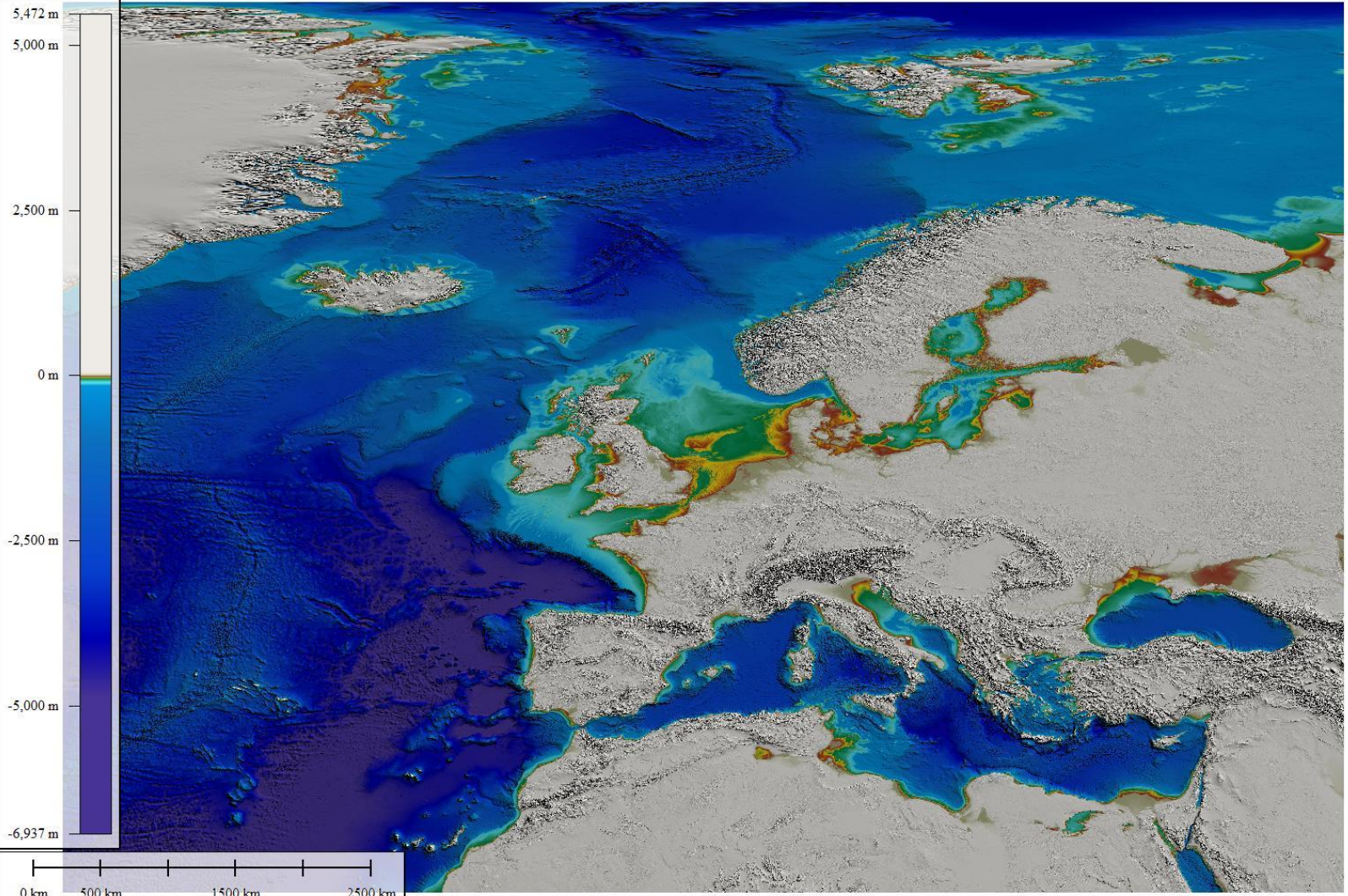


# A brief history of bathymetric DEM

## EMODnet



Eur  
Obs  
Dat

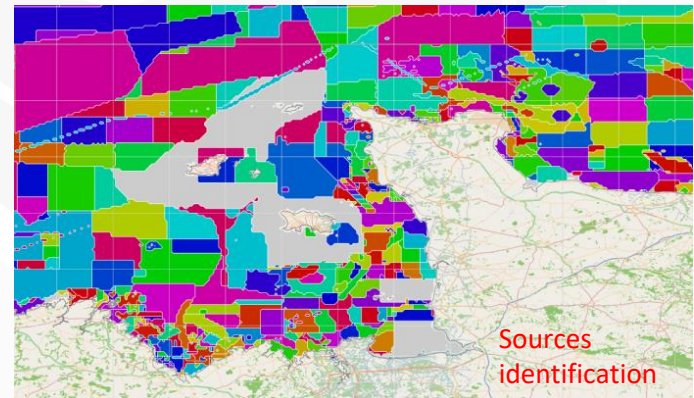
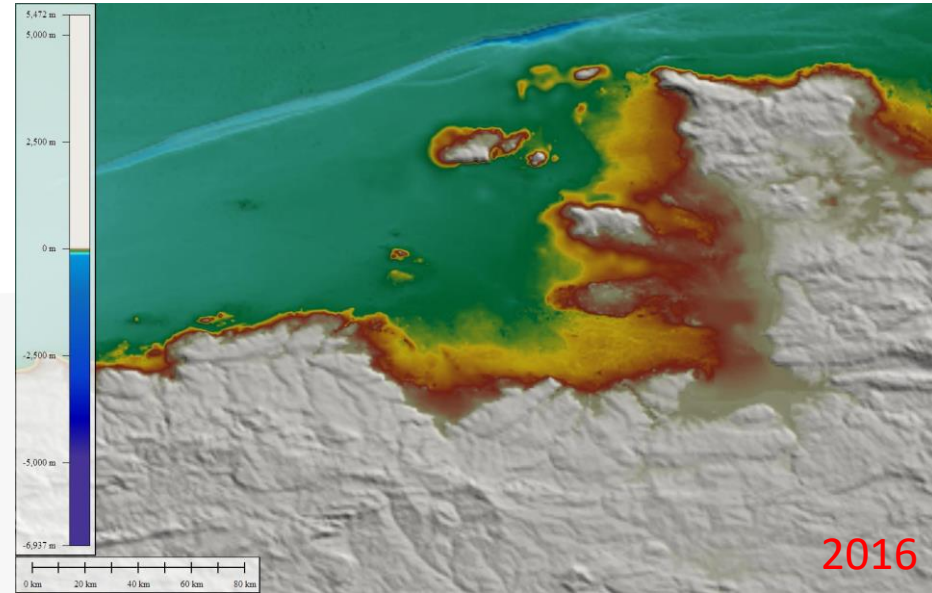
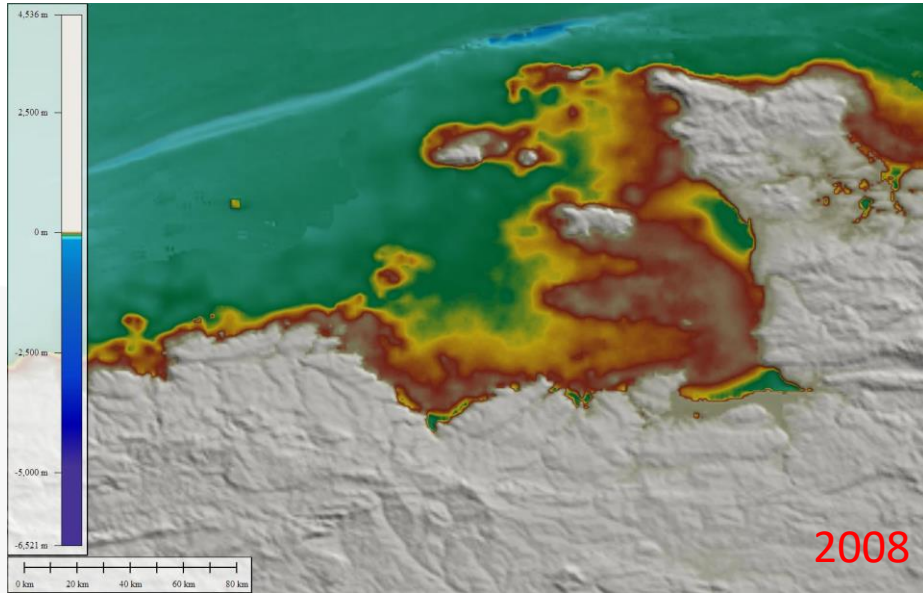




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6/13/2018

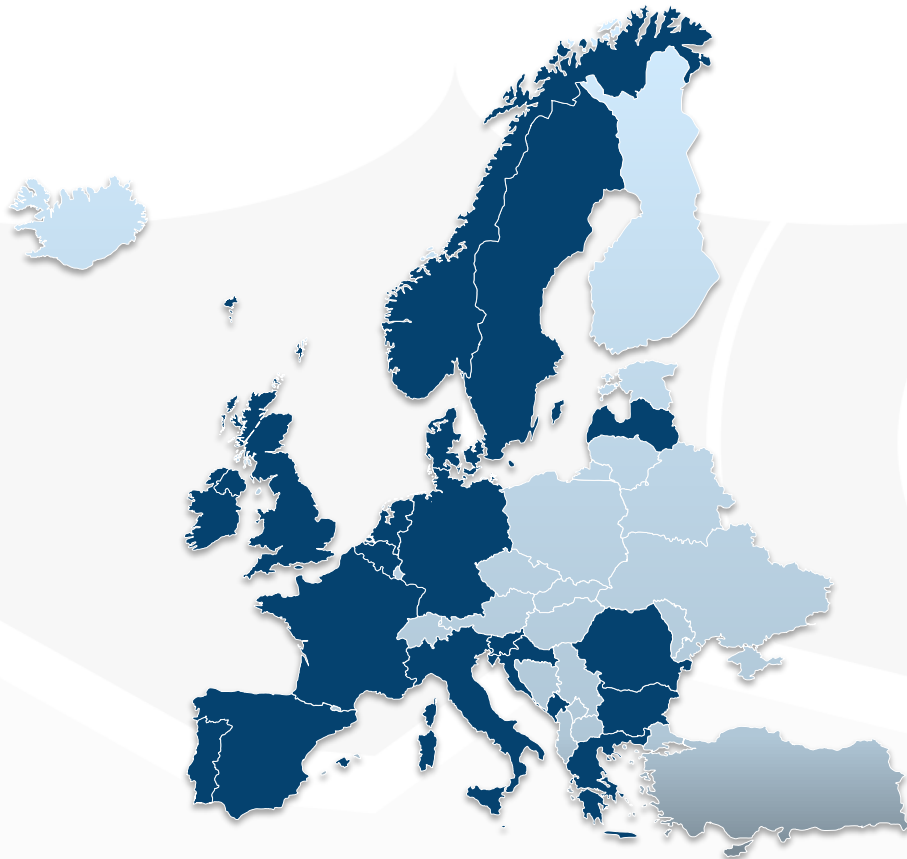


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European Marine Observation and Data Network

# EMODnet Bathymetry Consortium



6/13/2018



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Depth

Mean

Min

Max

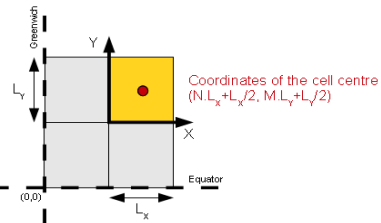
Standard deviation

Number of soundings

Number of datasources

Main dataset identifier (CDI)

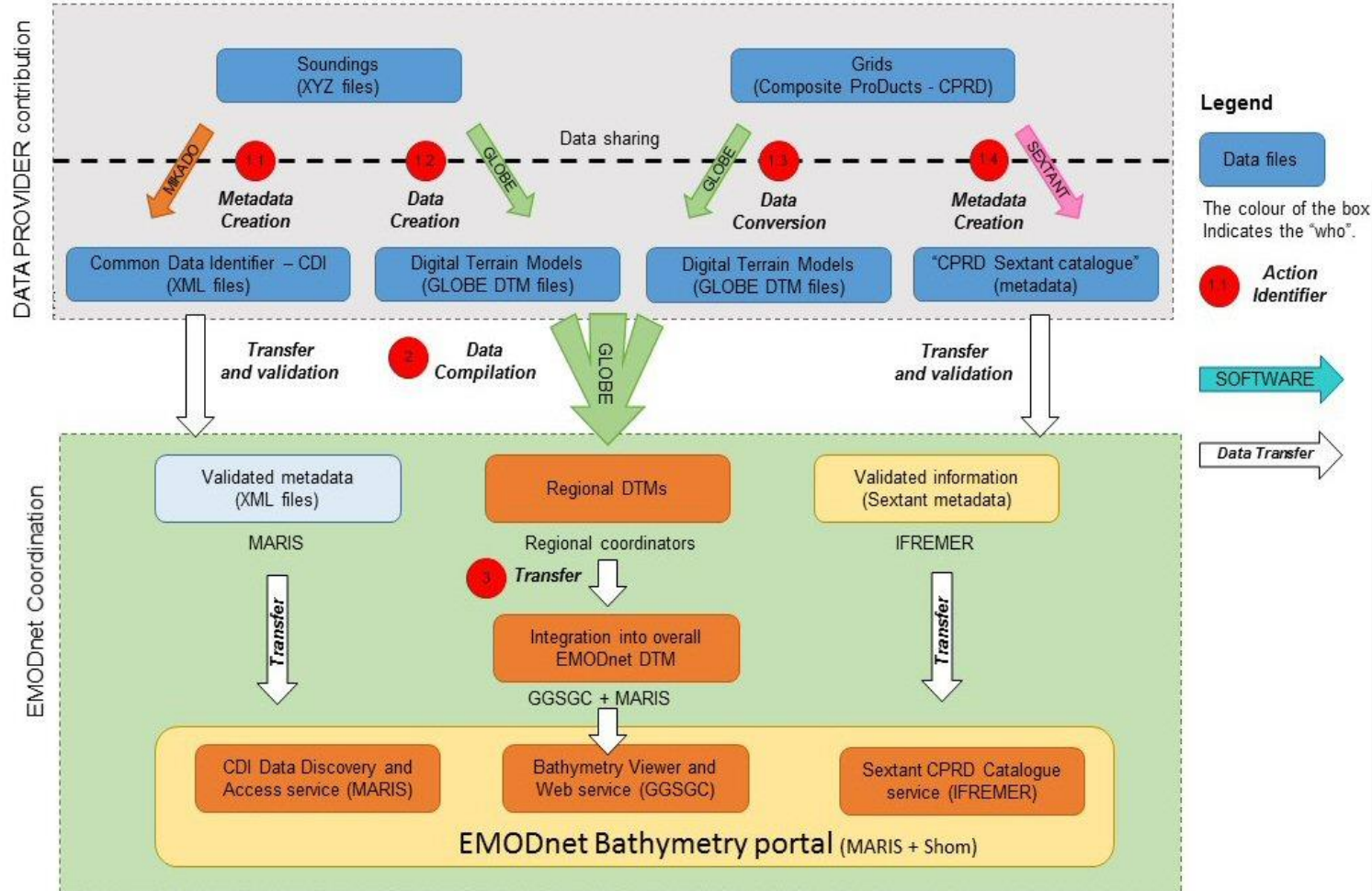
Greenwich



Mesh size in fraction of minute of arc	Corresponding value in meter
1	1852,00
4	463,00
16	115,75
64	28,94
256	7,23
1024	1,81
4096	0,45

## Summary: Global workflow

### GLOBAL WORKFLOW Input of a dataset in EMODnet bathymetry DTM

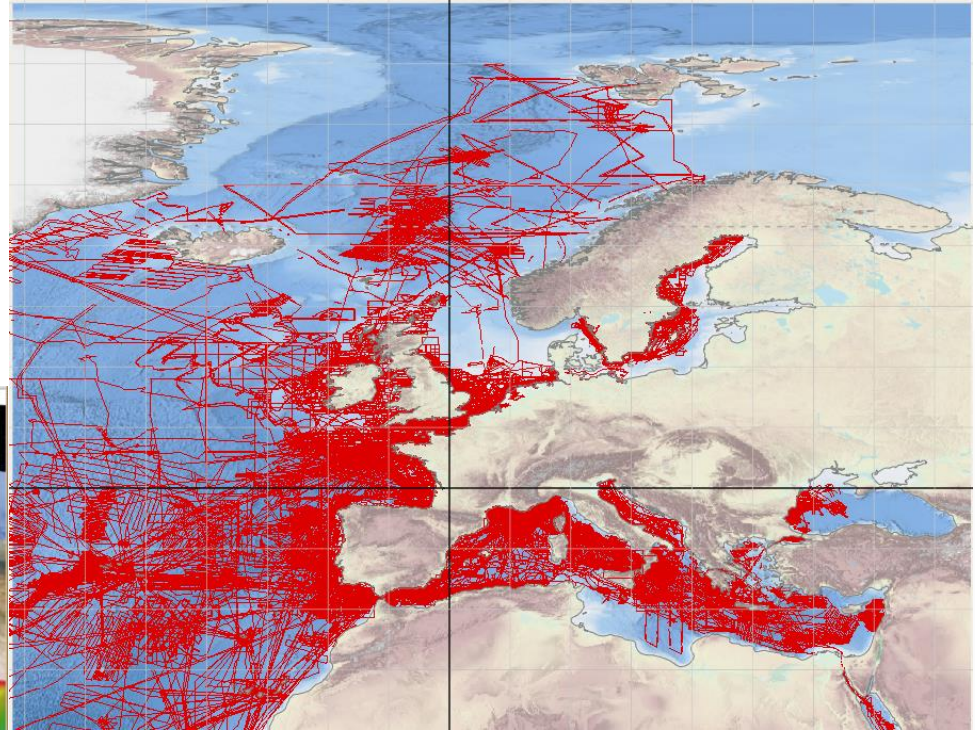
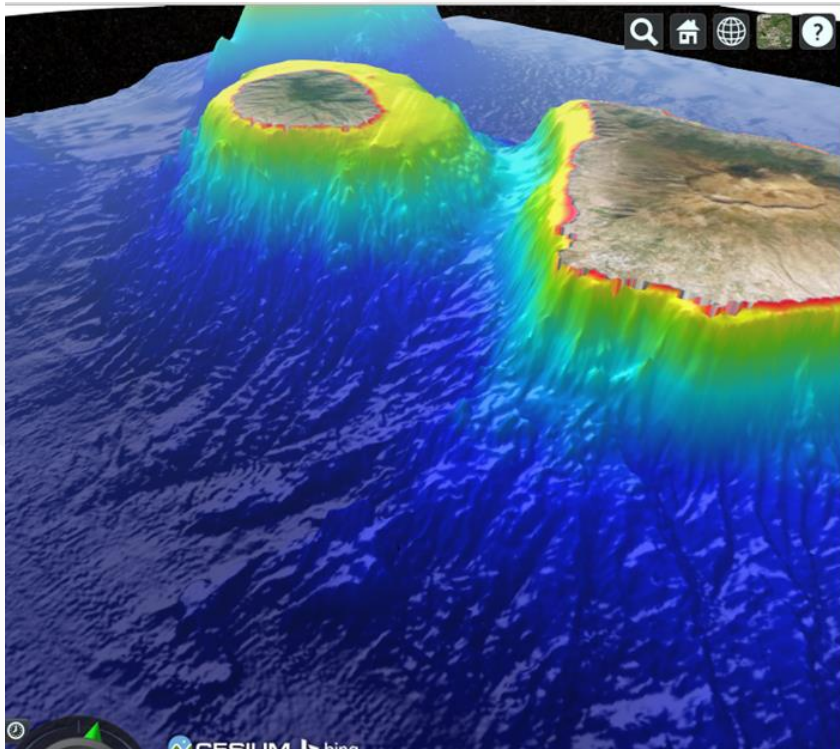




**EMODnet**



[www.emodnet-bathymetry.eu](http://www.emodnet-bathymetry.eu)



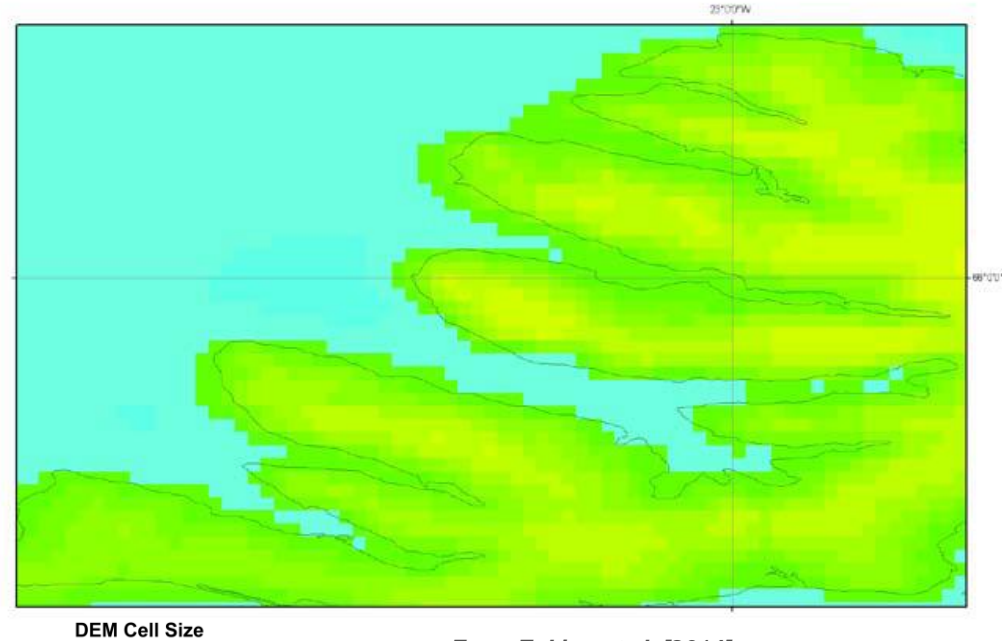
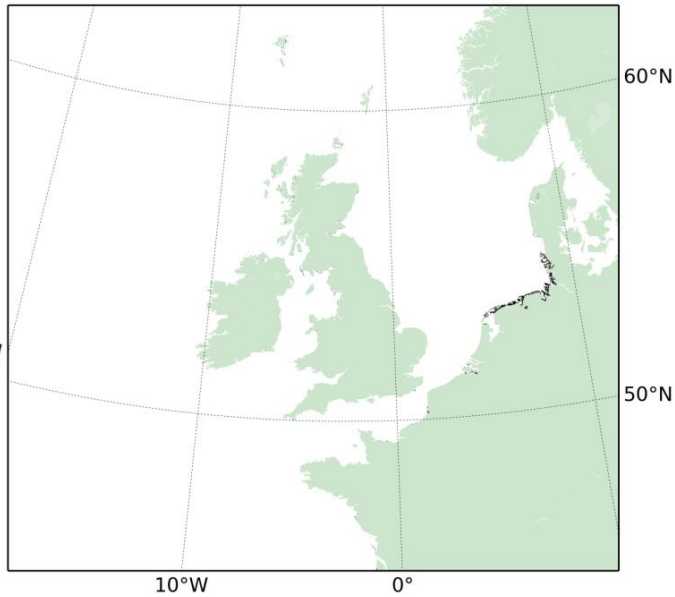


# EMODnet

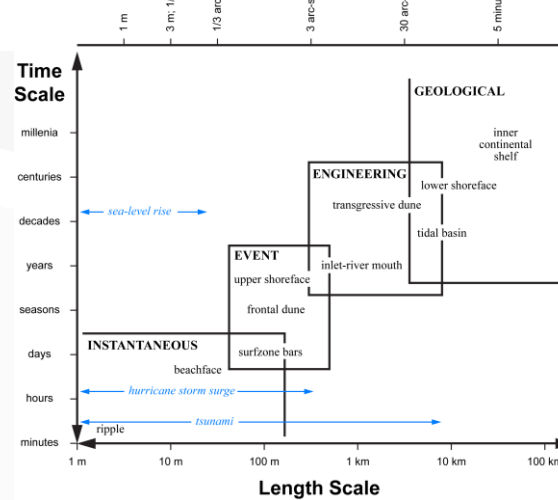


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Data Network

## Limitations in the coastal areas



From Eakins et al. [2014]



Modified after  
Cowell and Thom [1997].



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# SDB data provided to EMODnet Bathymetry by EOMAP








**EMODnet**

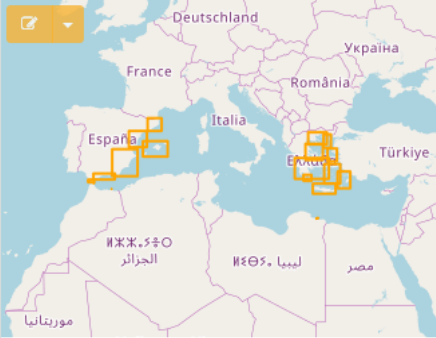


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# Metadata Catalogue

## Sextant Catalogue service

Search ... 



Deutschland, France, España, Italia, România, Ucraina, Türkiye, مصر, ليبيا, الجزائر, موريتانيا

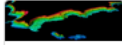
- Catalogue
- Sextant Themes
- Inspire Themes
- Keywords
  - Bathymetry and Elevation (18)
  - Lowest Astronomical Tide (18)
  - EMODNet Bathymetry (18)
  - cameras (18)
- Contact for the resource
- Years

[Reset filters](#)

Results 1 to 18 on 18 : 20 by page ▾

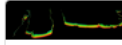
Sort by : Popularity ▾

### Satellite Derived Bathymetry South Aegean - Greece



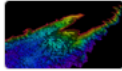
Data provides bathymetric information based on Landsat 8 satellite at 15 m resolution. Data were processed by the Modular and Inversion System (MIP) by EOMAP GmbH Co.KG. MIP is designed for the physically based.

### Satellite Derived Bathymetry Crete - Greece



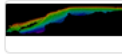
Data provides bathymetric information based on Landsat 8 satellite at 15 m resolution. Data were processed by the Modular and Inversion System (MIP) by EOMAP GmbH Co.KG. MIP is designed for the physically based.

### Satellite Derived Bathymetry Tobruk - Libya



Data provides bathymetric information based on Landsat 8 satellite at 30 m resolution. Data were processed by the Modular and Inversion System (MIP) by EOMAP GmbH Co.KG. MIP is designed for the physically based.

### Satellite Derived Bathymetry Andalusia, Murcia, Com. Valencia- Spain



Data provides bathymetric information based on Landsat 8 satellite at 15 m resolution. Data were processed by the Modular and Inversion System (MIP) by EOMAP GmbH Co.KG. MIP is designed for the physically based.

### Satellite Derived Bathymetry Peloponnese.

### Satellite Derived Bathymetry Attica, Central

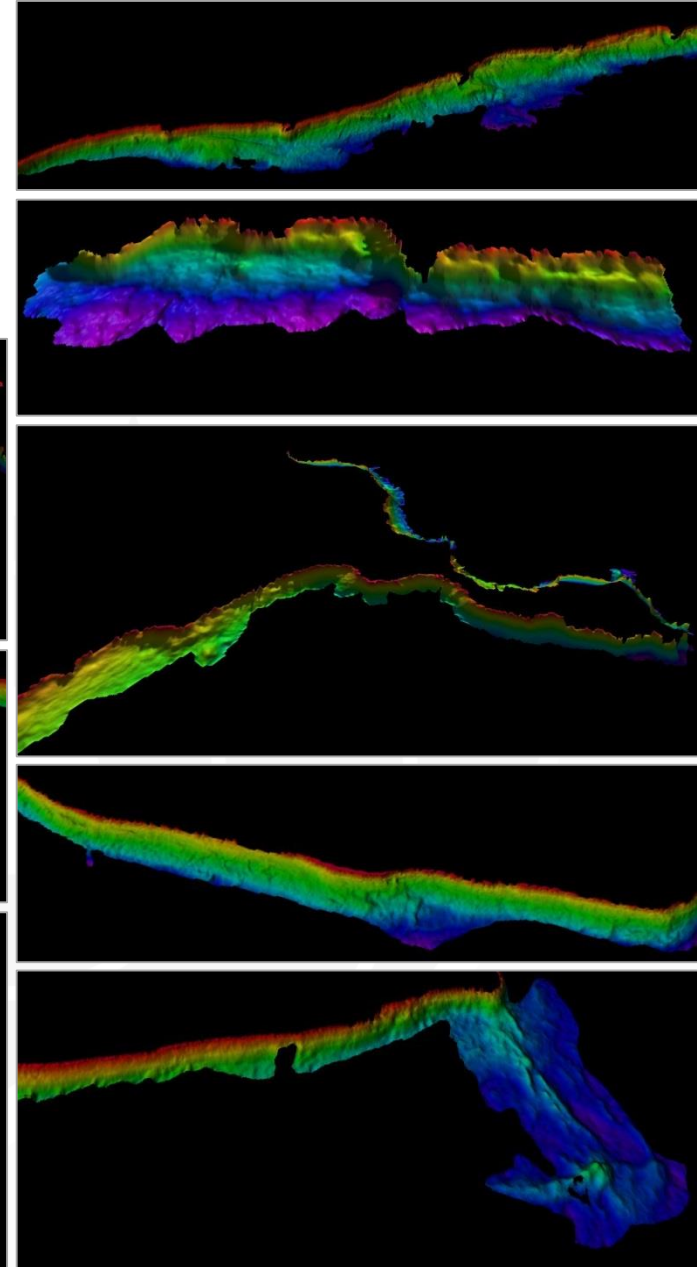
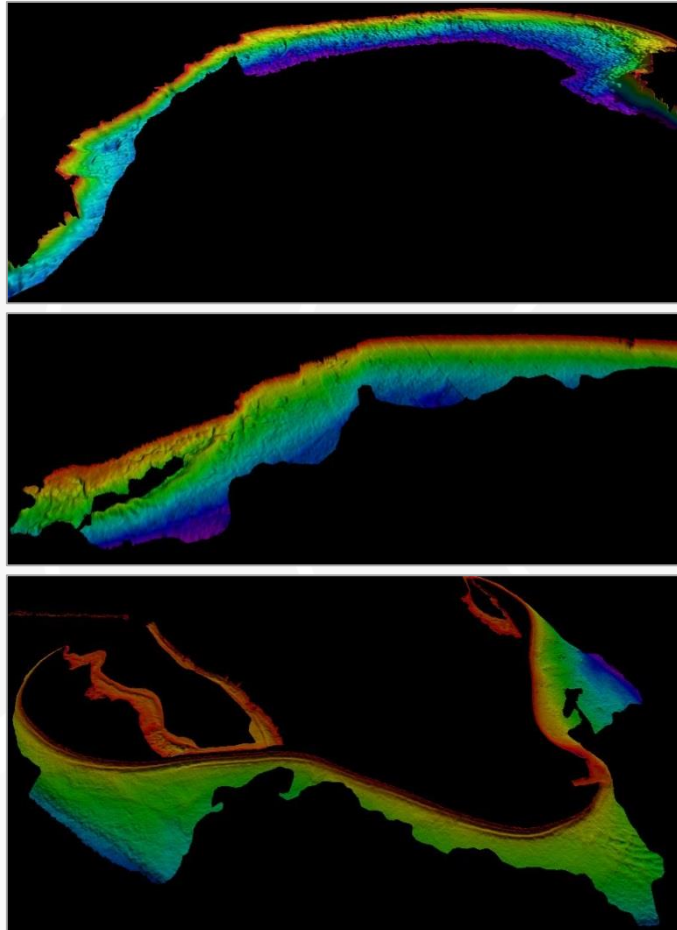
6/13/2018

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# Spain Mediterranean Coast

8 CPRD dataset for Spain Med. coast, including Ceuta and Melilla Average bathymetric data coverage down to 15m





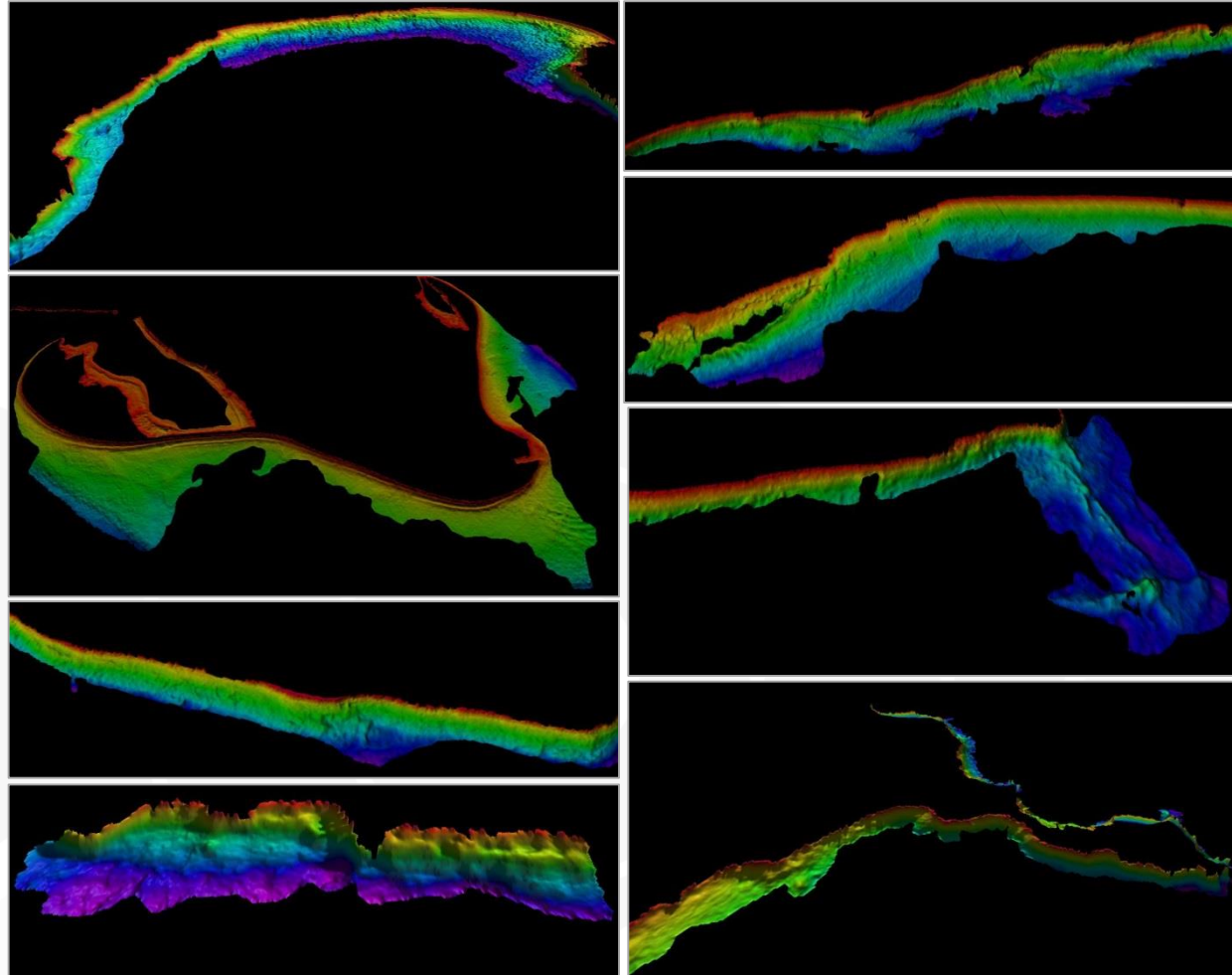
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## Aegean Sea and Peloponnes

9 CPRD dataset for Greece  
Agean Sea and Peloponnes.  
Average bathymetric data  
coverage down to 18m

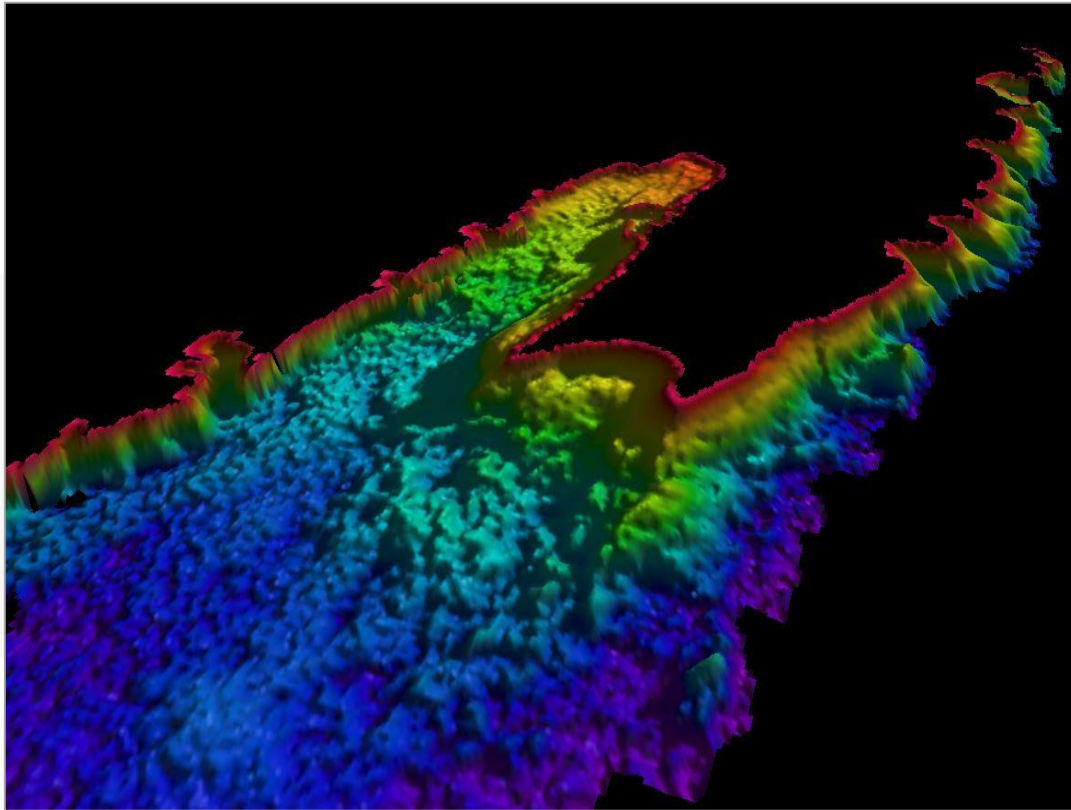




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## Aegean Sea and Peloponnes



1 CPRD dataset for Lybia, Tobruk area. Average bathymetric data coverage down to 20m

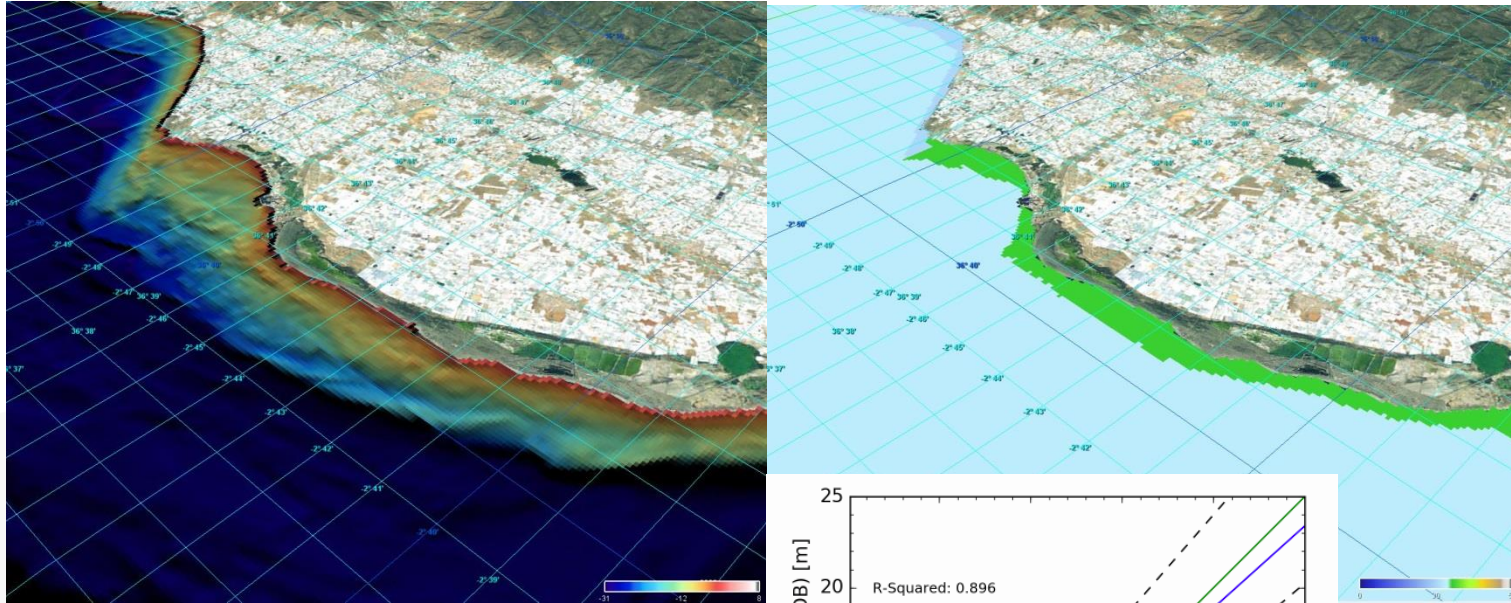


# EMODnet

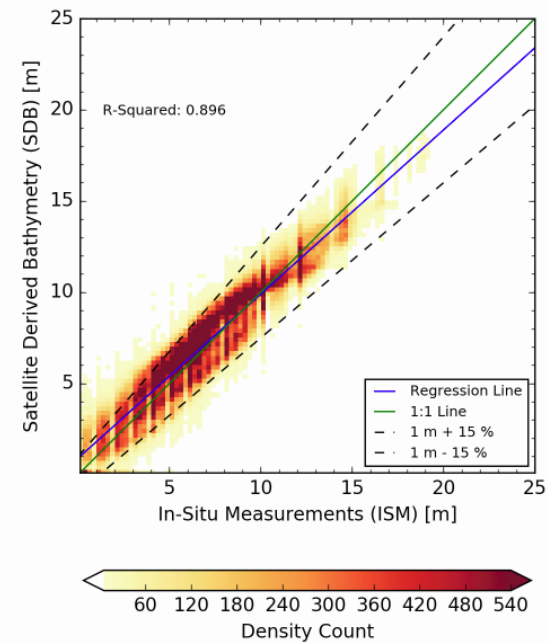


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## Western Mediterranean



Scatterplot of Satellite Derived Bathymetry vs. approx. 4 million acoustic survey point datasets and 0.4 million charting points for the Spanish Mediterranean coastline, showing a coherent fit with vertical uncertainties better than ZOC category C ( $2 + 5\%$ waterdepth).

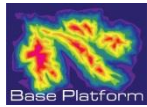


6/13/2018

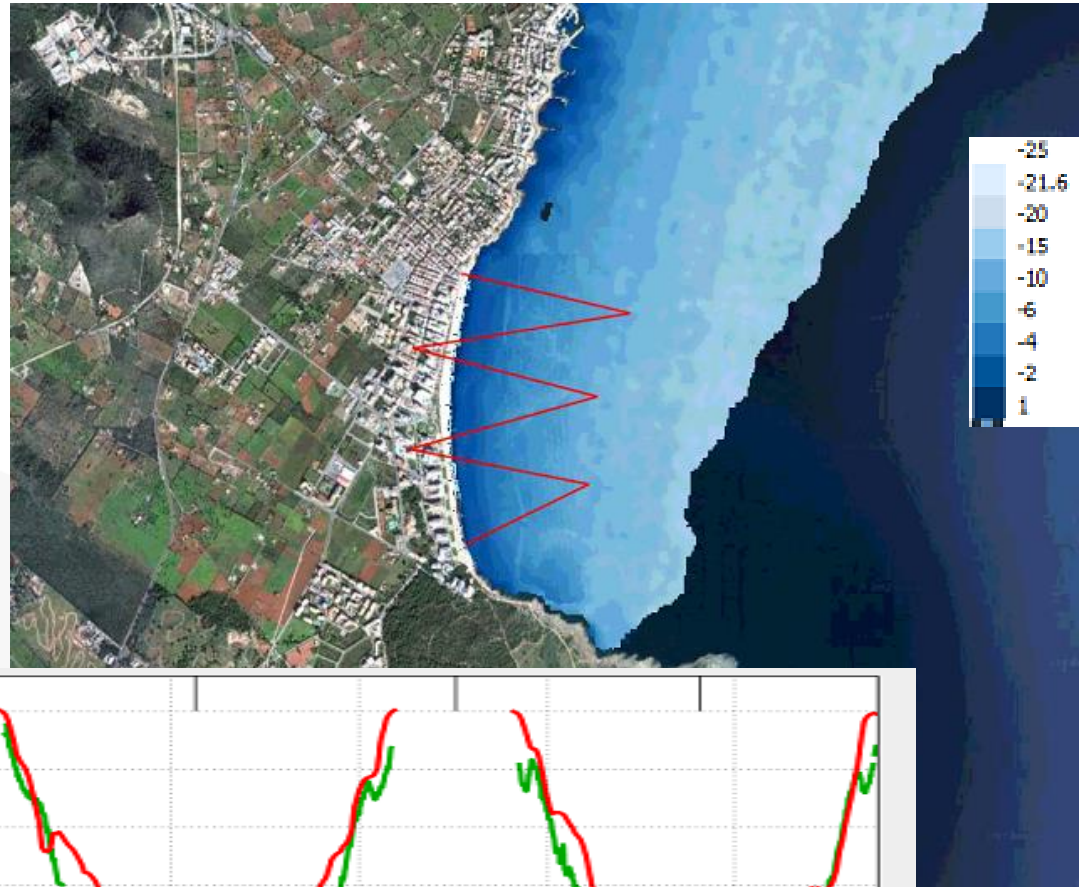
13



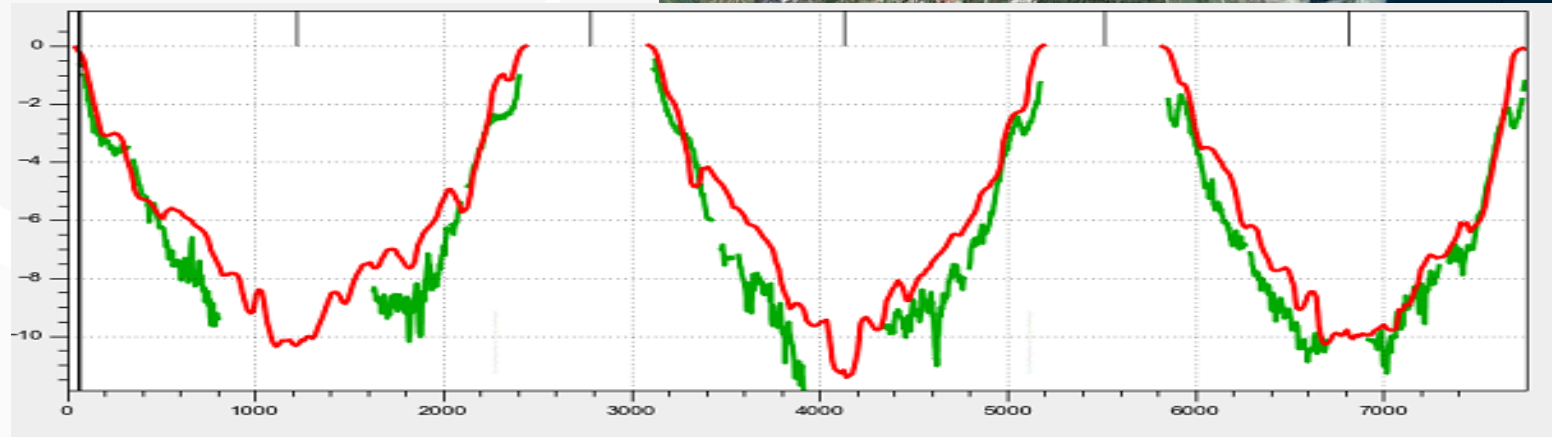
# EMODnet



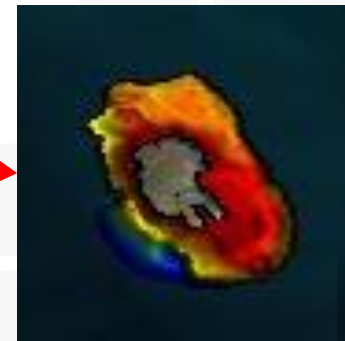
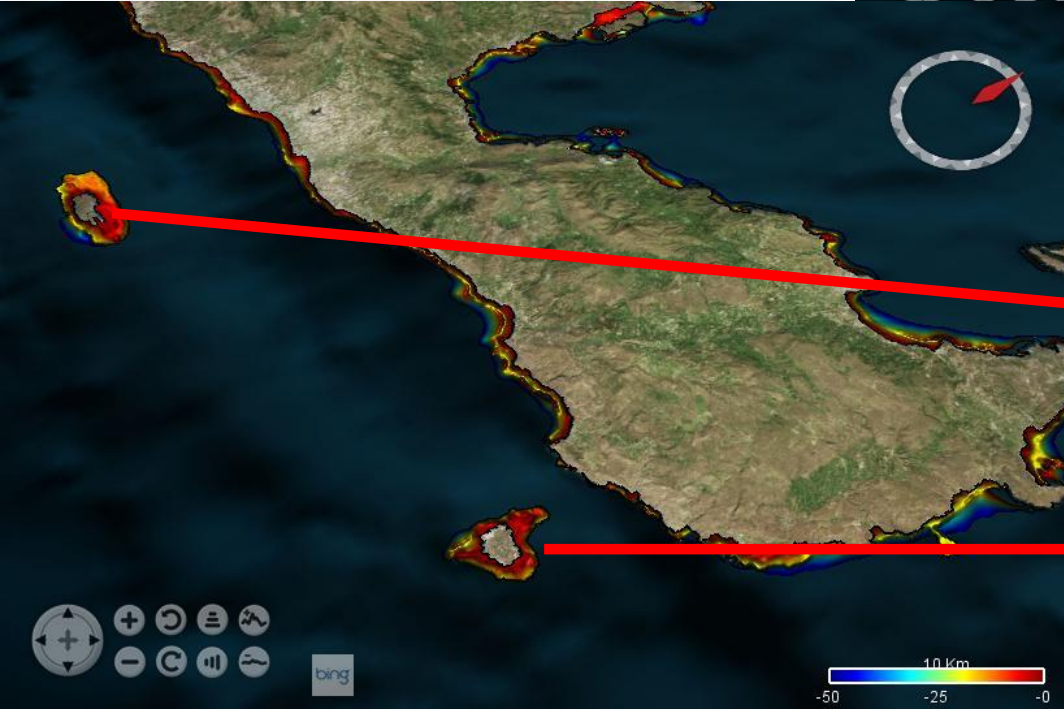
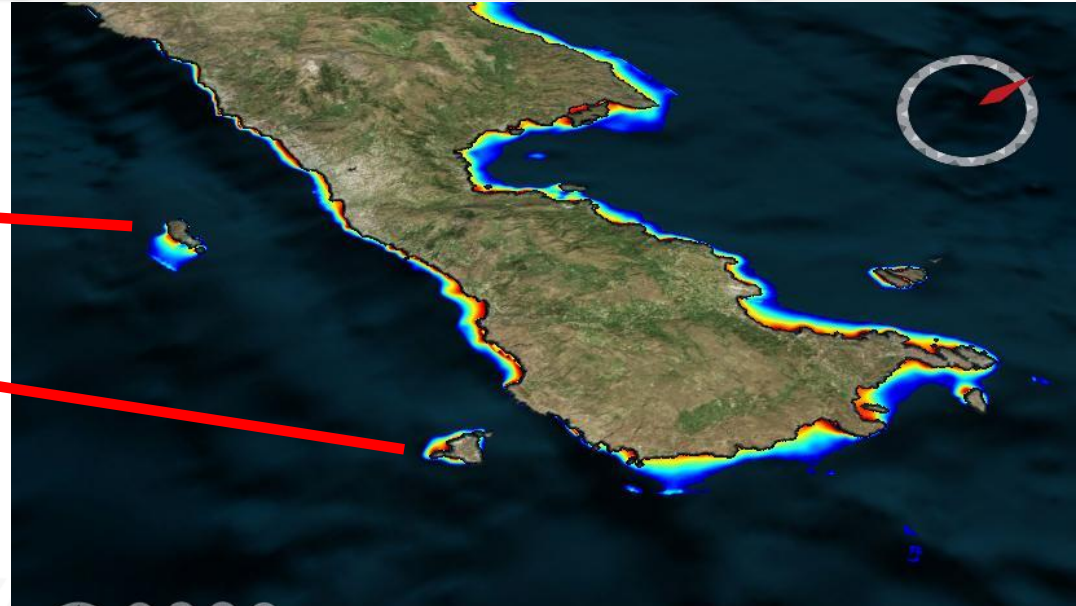
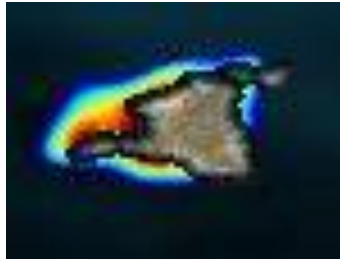
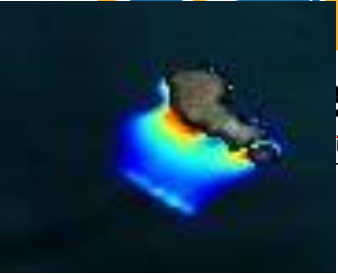
## Balearics



Satellite Derived Bathymetry  
High res. MBES



# Med east



Introduction

Generating  
EMODnet  
bathymetry

Need for SDB

Producing SDB

Integration of  
the SDB

Future work



**EMODnet**



# Island of Crete

## Satellite Derived Bathymetric Grid, Iraklion area, SDB (2018)



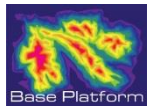
## EMODnet 1/8 (2016)



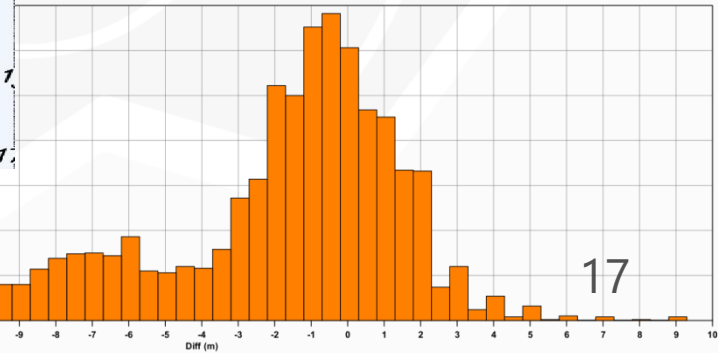
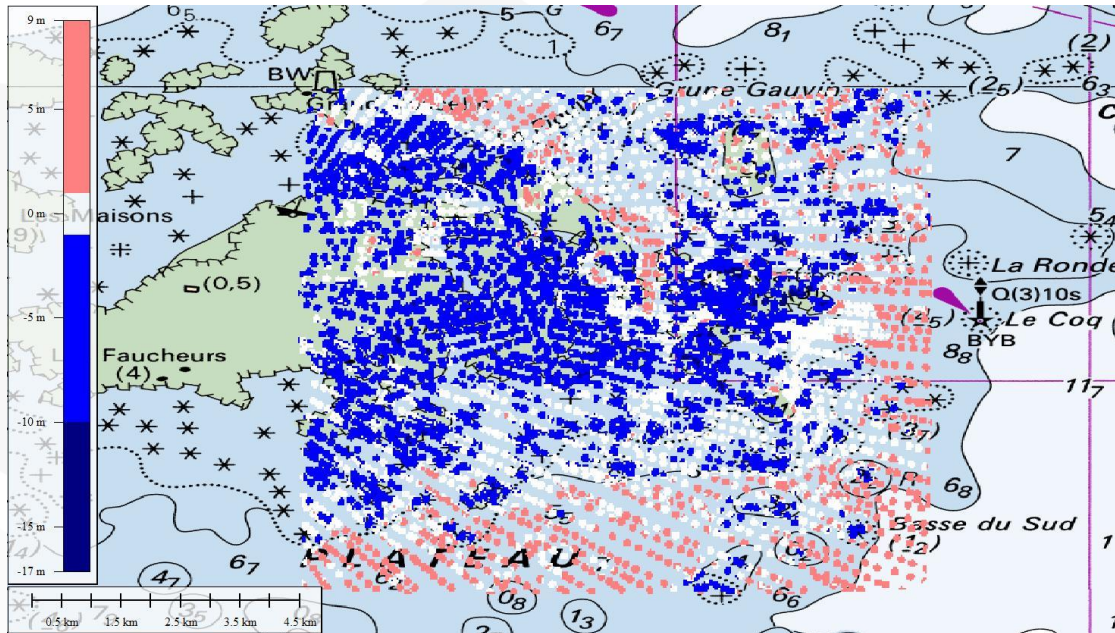
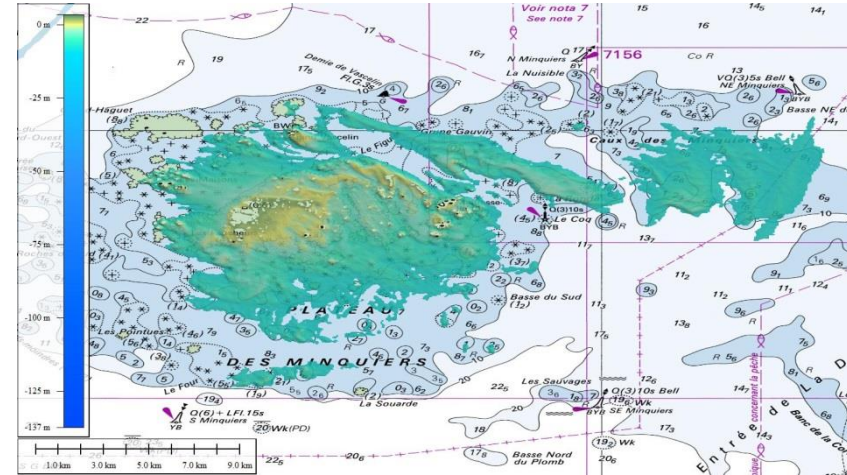




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## Channel Islands



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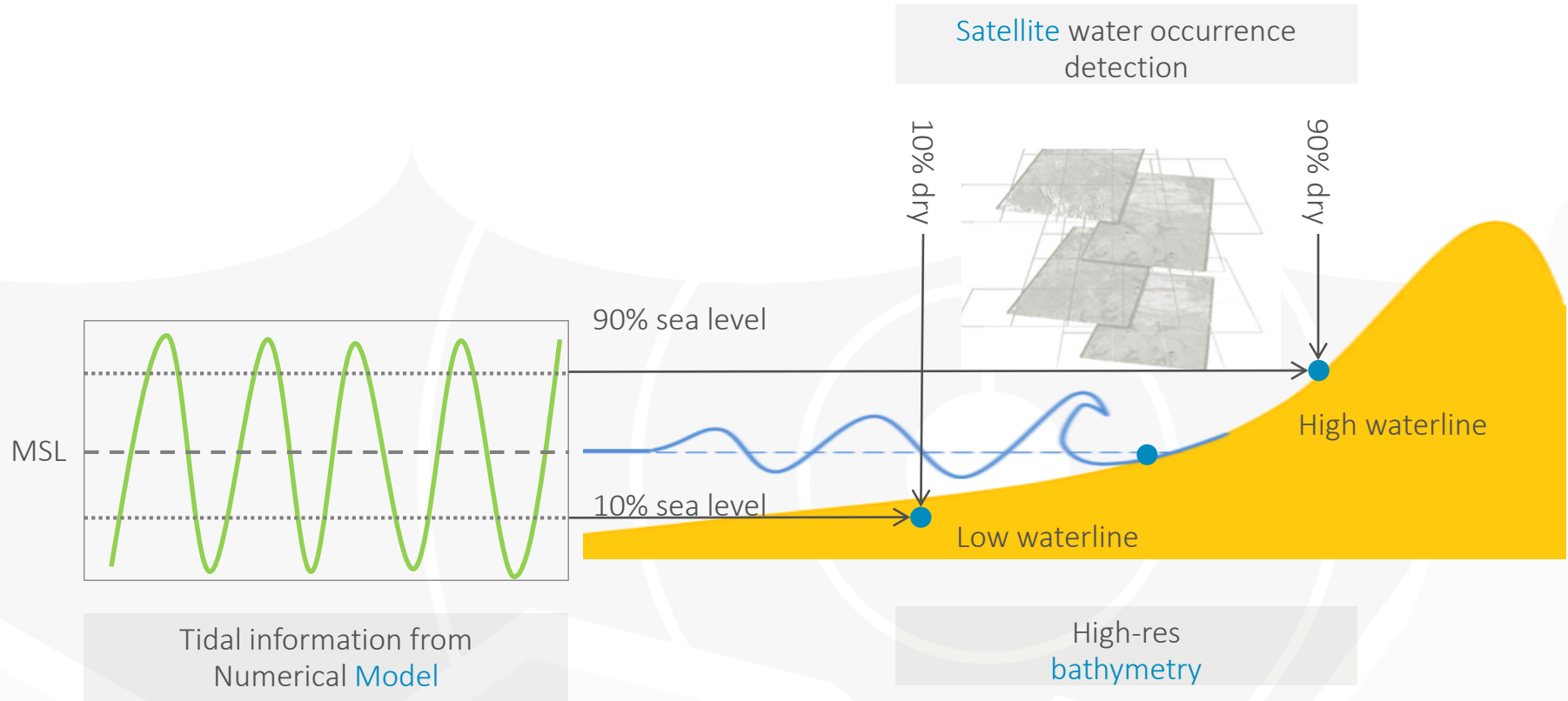
17



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## Coastline estimation





# EMODnet



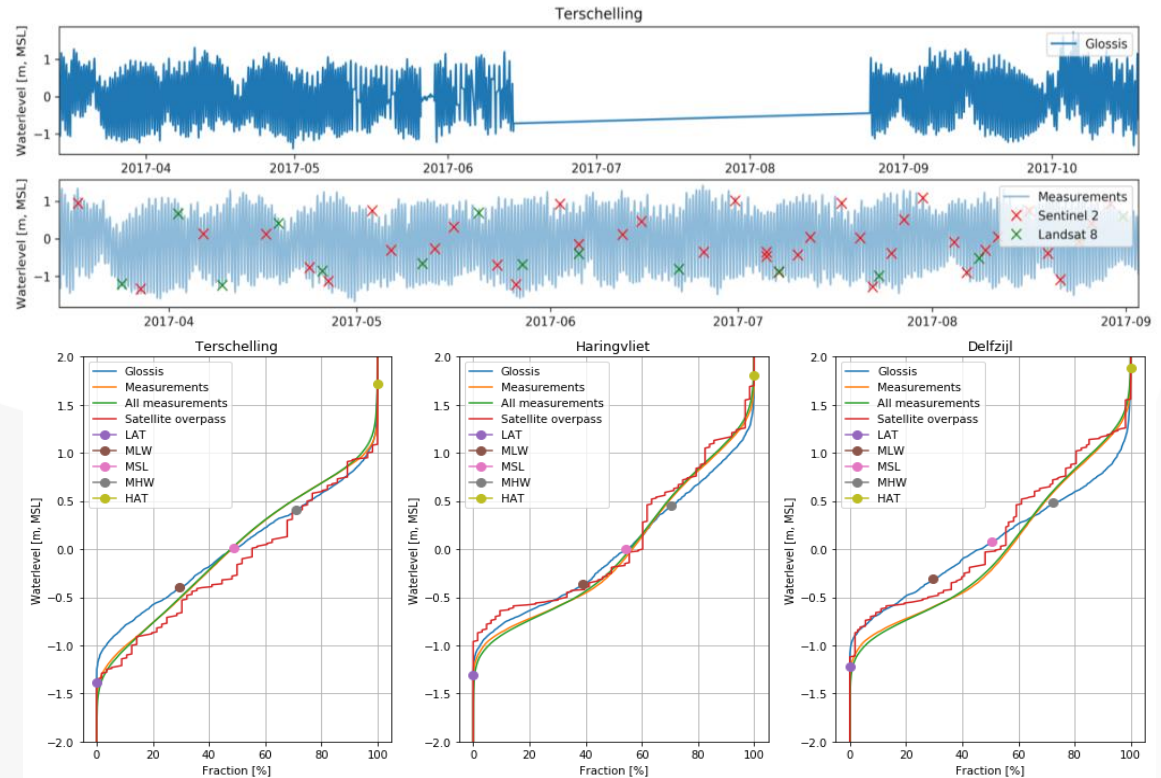
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## 1. Gather satellite data

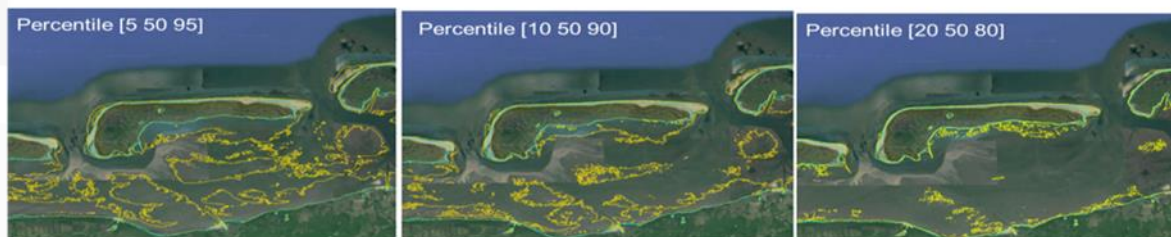
## 2. Detect Water bodies

$$NDWI = \frac{\rho_{green} - \rho_{nir}}{\rho_{green} + \rho_{nir}}$$

## 3. Relate satellite passage to water level



## 4. Extrapolate water bodies limits to defined tidal levels





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## DTM confidence estimation

Vertical pos  
system

Horizontal  
pos system

Type of  
substrate  
(EMODnet  
Geology or  
other)

As found in  
the CDI

Sounding density  
(as computed  
during gridding  
process)

Purpose of survey/  
respect of  
coverage  
specifications from  
S44

Error budget of Sensors  
composing the acquisition  
(inc processing)

Total Positioning Uncertainty  
Total Vertical Uncertainty

Age

Seabed  
mobility  
Index

Accuracy

Temporal  
Representativity

Completeness



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Introduction

Generating  
EMODnet  
bathymetry

Need for SDB

Producing SDB

Integration of  
the SDB

Future work

QI_horizontal	QI_vertical	QI_age (provider expresses it through)	Respect of a standard (abstract)
Unknown or > 500m (That is grossly equivalent to TACAN, OMEGA systems or similar)	0: Unknown, plummet, leadline	> 30 y	Purpose of the survey unknown (historical survey with no associated information).
between 500m and 50m (That is grossly equivalent to LORAN, DECCA systems or similar)	1: SBES Low Frequency, SDB (similar than 2+5%d)	10-30 y	Transit and/or opportunity
between 50m and 20m (That is grossly equivalent to natural GPS systems)	2: MBES low frequency (lower than 100kHz) (similar than 1+2%d)	5y -10 y	Bathymetric/morphologic survey
< 20m (GPS with correction) (That is grossly equivalent to aided GPS system DGPS, RTK ...)	3: Lidar, SBES High Frequency	0y – 5y	Hydrographic survey or compatible with hydrographic standards
	4: MBES High frequency (higher than 100kHz) (1+0.5%d)		



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# Bathymetry

Developing and providing a harmonised Digital Terrain Model (DTM) for the European sea regions

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CDI Data Discovery and Access service

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### EMODnet DTM

Bathymetry Viewing and Download service

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### COMPOSITE DTM

Sextant Catalogue service

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## WELCOME TO THE EMODNET BATHYMETRY PORTAL

The **EMODnet-Bathymetry portal** is being developed in the framework of the European Marine Observation and Data Network (EMODnet) as initiated by the European Commission. It provides a service for viewing and downloading a harmonised Digital Terrain Model (DTM) for the European sea regions that is generated by the EMODnet Bathymetry partnership on the basis of an increasing number of bathymetric data sets. These are managed as survey data sets and composite DTMs by data providers from government and research. Services for discovery and requesting access to these data sets are provided as well. [Read more](#)



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