



**GEBCO 2013 – TSCOM**

**EMODNET Hydrography  
status report**

**Eric Moussat, Ifremer  
on behalf of the Emodnet consortium**

## Background and objectives

- EU proposed to take steps in 2008 towards an overarching **European Marine Observation and Data Network (EMODnet)**
- The Commission launched **preparatory actions** to set up portals
  - Build on existing structures
  - granting access to certain types of data over a number of maritime basins
  - for regional data products and underlying data
  - with the aim to identify data availability and gaps in data coverage
- The EMODNET Hydrography portal results of one of these preparatory actions.

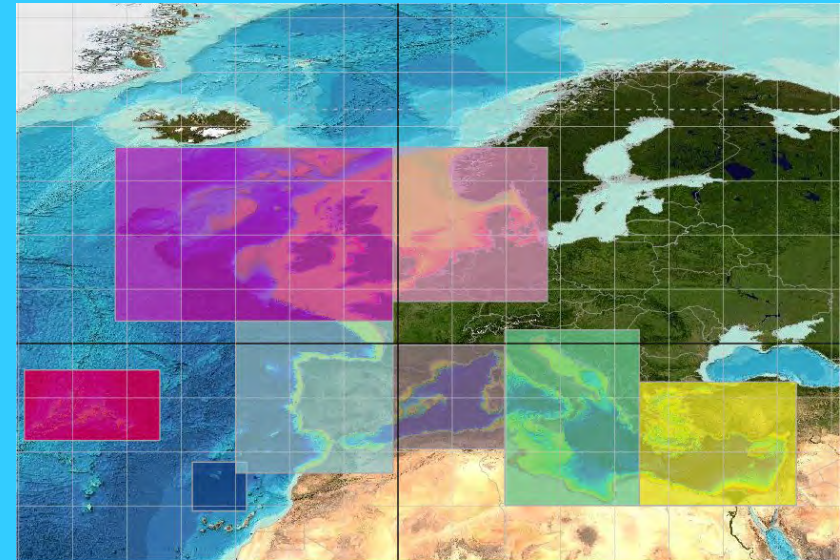
For the specified sea basins :

- Compile an inventory of available bathymetric surveys (single and multibeam surveys...) including links to survey data sets, adopting the SeaDataNet Common Data Index (CDI) Data Discovery and Access service
- Produce a high resolution digital bathymetry
- Compile an overview of coverage of European waters by hydrographic surveys and assess the costs for overall high resolution mapping

# EMODnet hydrography coverage

- At present the EMODnet Hydrography portal provides Digital Terrain Models (DTM) for the following regions:

- Atlantic Ocean : Channel, Celtic Seas and Western Approaches
- North Sea and Kattegat
- Mediterranean : Western, Central and Ionian Seas
- Atlantic Ocean : Iberian Margin and Bay of Biscay
- Mediterranean : Adriatic, Aegean and Levantine Sea
- Macaronesia : Madeira and Azores



- From mid 2014 this will include also:
  - Baltic Sea
  - Black Sea
  - Norwegian - Icelandic Seas
  - Canary Islands (as part of Macaronesia)

# EMODnet hydrography product



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- DTMs that have been produced at regional level from collated bathymetric data sets and are integrated into a central DTM.
- The DTM is a regular rectangular grid of at least 1/4 minute of longitude and latitude. From mid 2014, the resolution made available will be up to 1/8 of a minute.
- The content (multi-layer), and the 3 steps mechanism to build the DTM (sampling, aggregation, product creation) have been designed to satisfy both :

- the data policy of the providers
- the end users needs in matter of quality assessment and reusability

And to take advantage of the EU distributed data infrastructures (SeaDataNet, Geo-Seas) to keep track of the data lineage .

### Harmonization of DTM production in EU distributed infrastructures

Eric Mouzet, Ifremer, eric.mouzet@ifremer.fr  
 Basile Lodiou, Ifremer, basile.lodiou@ifremer.fr  
 Thierry Schmitt, SHOM, thierry.schmitt@shom.fr

**ABSTRACT**  
 Bathymetric products result of measurements carried out by various organisations whose responsibilities and objectives differ significantly from one to another: oceanographic institutions, universities, hydrographic offices and private companies. Collecting soundings by these organisations to make bathymetric products is time consuming and expensive. Many of their data sets are not included in public catalogues. Policies of data providers might restrict their access especially in cross border areas or require long, and not always successful, negotiations. Lack of common approaches (metadata and data content made available, geometry, vocabularies and formats) to generate bathymetric products makes processing complex and sometimes impossible.

A general mechanism to create DTM (Digital Terrain Model) has been developed to provide bathymetric data from multiple data providers. This has been done in the framework of the European EMODnet hydrography, Geo-Seas and Suboceanic (SDN) initiatives and distributed marine data infrastructures.

- 1. GENERAL REQUIREMENTS**

Parameter	Value	Unit	Comment
Grid type	Regular		
Grid resolution	1/4 minute	Longitude/Latitude	
Grid extent	Global		
Grid projection	WGS 84		
Grid datum	WGS 84		
Grid reference system	Geographic		
Grid coordinate system	Longitude/Latitude		
Grid units	Decimal degrees		
Grid format	NetCDF		
Grid compression	None		
Grid metadata	Standard		
Grid quality	High		
Grid version	1.0		
Grid creation date	2013-10-15		
Grid update date	2013-10-15		
Grid update frequency	Annual		
Grid update cycle	1 year		
Grid update interval	1 year		
Grid update start date	2013-10-15		
Grid update end date	2014-10-15		
Grid update duration	1 year		
Grid update status	Final		
Grid update reason	Annual update		
Grid update description	Annual update		
Grid update contact	SHOM		
Grid update email	thierry.schmitt@shom.fr		
Grid update phone	+33 (0)2 98 22 22 22		
Grid update fax	+33 (0)2 98 22 22 22		
Grid update website	http://www.shom.fr		
Grid update address	SHOM, 1 rue de l'Estuaire, 94100 Saint-Mandrier-sur-Mer, France		
- 2. SOURCE DATA SAMPLING**

Modified regular rectangular grids with common origin  
 Unique hierarchy of resolution  
 Use of SDN Common Data Index (CDI) to identify source datasets (CDI)  
 Multi layer grids to transport information for DS aggregation. Unique and quality assessment  
 Sampling data are decimated in the most appropriate grid depending of the survey characteristic
- 3. AGGREGATION MECHANISM**

**DISTRIBUTED DATA CENTERS**

Data providers:  
 - Exchange easy to implement  
 - Data distribution more flexible  
 - Preservation of the data providers policies  
 - Protection of their datasets included in SDN/Geo-Seas CDI catalogue

Data users:  
 - Faster and simplified data access (depending on selected resolution)  
 - Easier quality assessment and lineage control  
 - Harmonized data content and format  
 - Reusability  
 - Access to metadata of source datasets using CDI Id
- 4. MULTI LAYER PRODUCT GRID (product)**

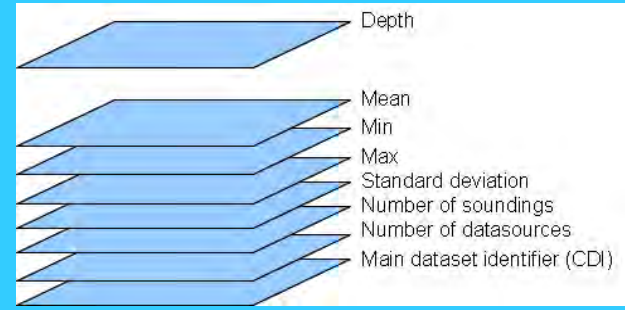
3D product

2D product

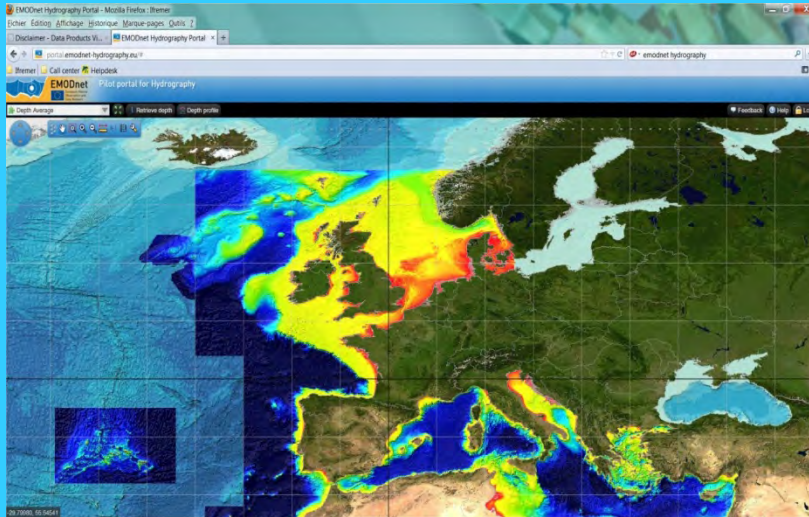
1D product
- 5. PRODUCT AND VIEWING SERVICES**

Web services can be offered such as 3D viewing using tools such as the Slide 3D viewer (Ifremer), a freeware adapted to the Geo-Seas purpose. Both the DTM products and the corresponding services are designed to help and ease to access bathymetric products, metadata and other qualitative attributes and to assess the quality of the source data sets and their fitness of use.
- 6. CONCLUSION**

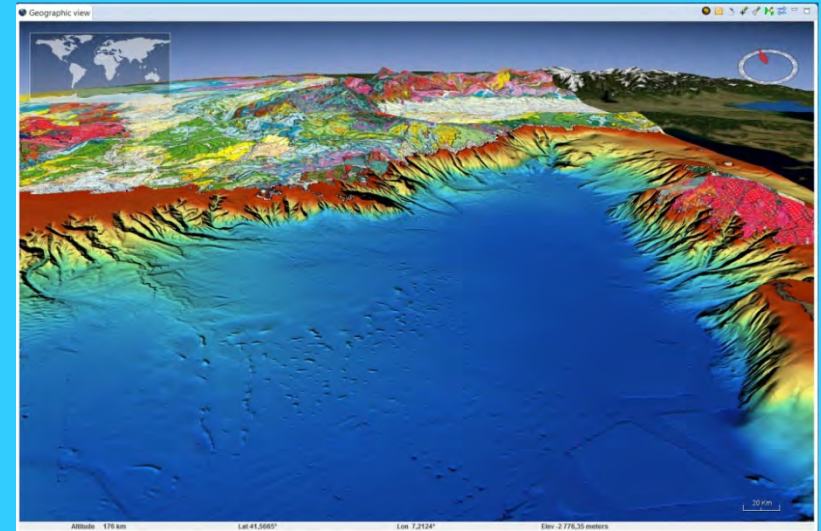
The success of the European projects using similar principles and procedures show that the proposed mechanism to provide data has been well accepted by many partners as it preserves their technical skills, giving more visibility on their activities. The mechanism allowed a decentralised cooperation for the production of large coverage products, using distributed grid and keeping source datasets (at the highest resolution) local and managed by the data provider. This decentralisation allowed also a closer interaction with local activities. Overall the mechanism contributed to create the EMODNET DTM of the European Sea in a remarkable short time.  
<http://www.emodnet-hydrography.eu/>  
<http://www.geo-seas.eu/>  
<http://www.osandnet.org/>



- DTM downloading service using various formats.
- Viewing services of DTM layers and metadata



2D viewing services



3D viewing using Geo-Seas viewer Globe (Ifremer)

- Data discovery and access service using the SeaDataNet and Geo-Seas infrastructure to identify and request access to hydrographic survey data prevailing at each node of the grid that are managed by a range of organisations and that are at the basis of the digital bathymetry products.

## SeaDataNet/Geo-Seas Common Data Index access

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Geographic view

Altitude: 332 km

OB Globe

CDI message: SDN CDI LOCAL 48E\_111921  
 ECOMO-CODE = 406  
 LOCAL-CDI-ID = 111921  
 Link: Geo-Seas

**GEO-SEAS COMMON DATA INDEX (CDI) V2**

The selected data set is described below with metadata. Access to the data set itself can be requested via the Geo-Seas portal that gives an overview and access to marine and coastal data sets acquired and managed by European organisations. Go to: <http://www.geoseas.eu>  
 All data are also available through the pan-European SeaDataNet portal: <http://www.seadatanet.net>

SWISS 17	
Data set name	111921
Discipline	Marine geology Tectonics
Category	Gravity, magnetics and bathymetry Tectonics
Variables measured	Bathymetry and Elevation
Abstract	SOCEM 01 - subswath
Data format	Climate and Forecast NetCDF Version 3.5
Data size	350.025
Observed creation date	20071221
WHOI SET	
Map	

DPL 14

W001



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## GEBCO

General Bathymetric Chart of the Oceans

About us | Data and products | Training | Regional mapping | General interest | Links

**Data and products**

- Gridded bathymetry data
- Grid display software
- GEBCO Digital Atlas**
- Undersea feature names

**Web services**

- GEBCO world map
- IHO-IOC GEBCO Cook Book

**Imagery**

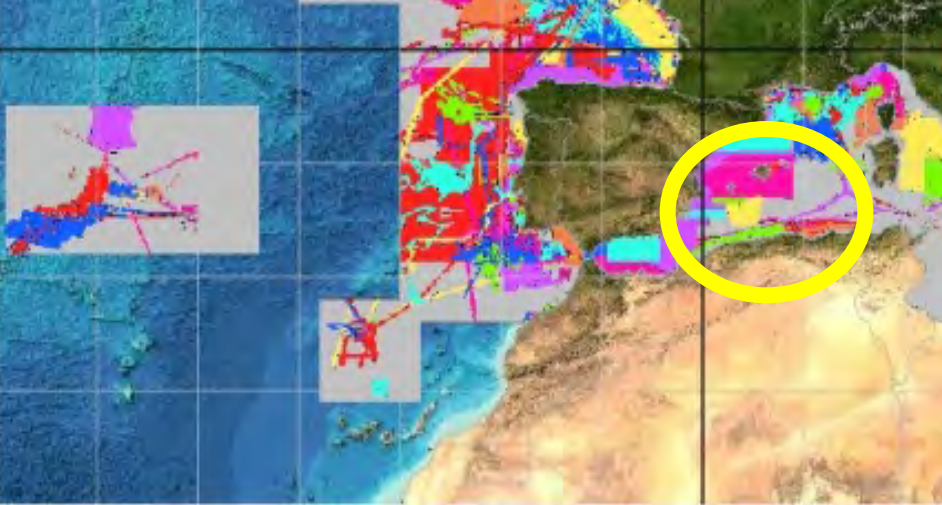
Hot view photos

**GEBCO Digital Atlas**

The Centenary Edition of the GEBCO Digital Atlas (ODA) is a two-volume DVD and CD-ROM set which contains:

- the GEBCO\_2013 global bathymetric grid at 30 arc-second intervals
- the GEBCO One Minute Grid global bathymetric grid
- a global set of digital bathymetric contours and coordinates
- the GEBCO gazetteer of undersea feature names
- a software interface for viewing and accessing the data sets

The print of the atlas in CD-ROM, including of names and markings, & several more of DVD is available to:



Geographic view

Altitude: 332 km

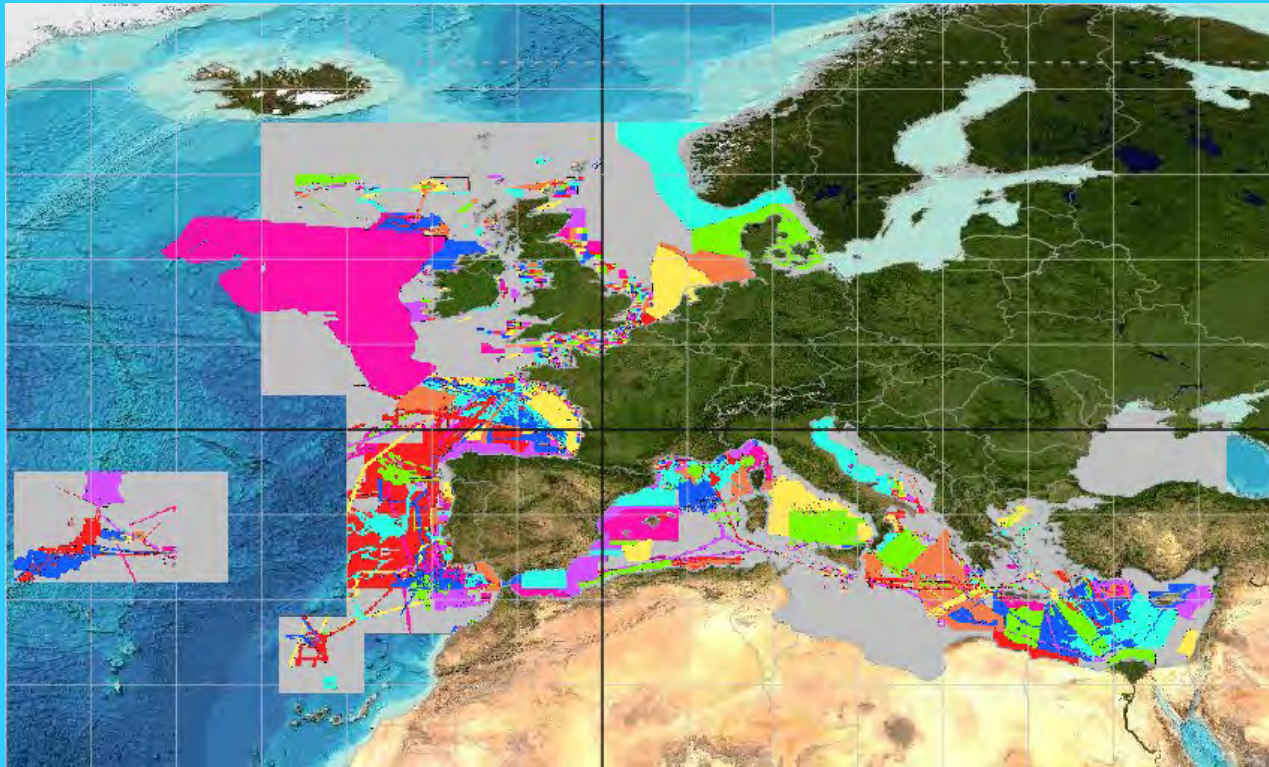
Lat: 41.8740°

Lon: 6.4943°

Sea: 2 727.28 meters

CDI message: GEBCO\_2010330  
 ECOMO-CODE =  
 LOCAL-CDI-ID = 2009330  
 Link: GEBCO

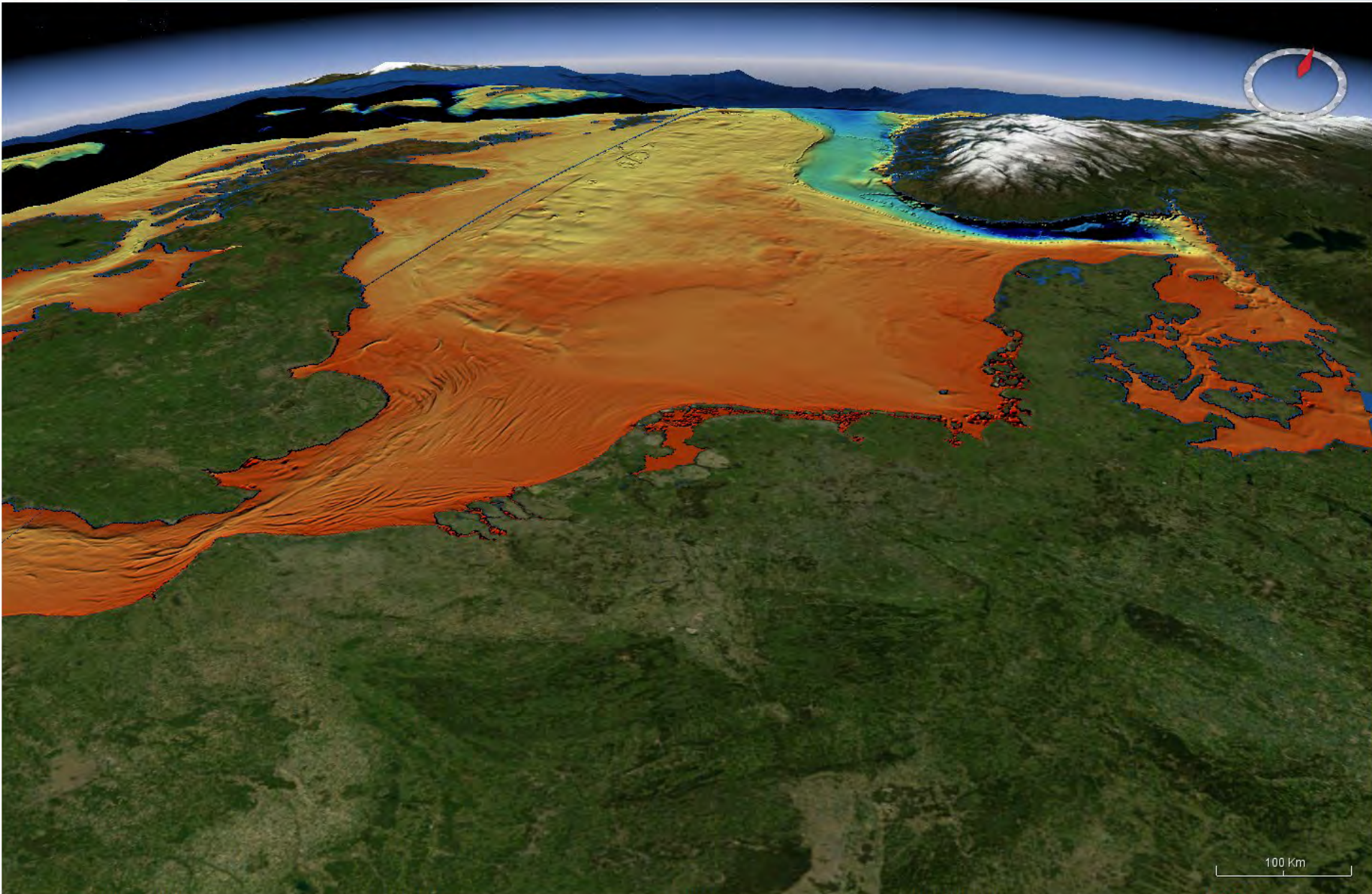
- Survey data in EMODnet grid:
  - 9200 surveys (identified in dataset id. layer)  
(+ 800 / last release),
  - from 15 data centres (+1 / last release)
  - from 9 European countries (+ 6 / last release)
  - from 120 originators (+ 6 /last release)





# Results

Geographic view



Altitude 689 km

Lat 51,3920°

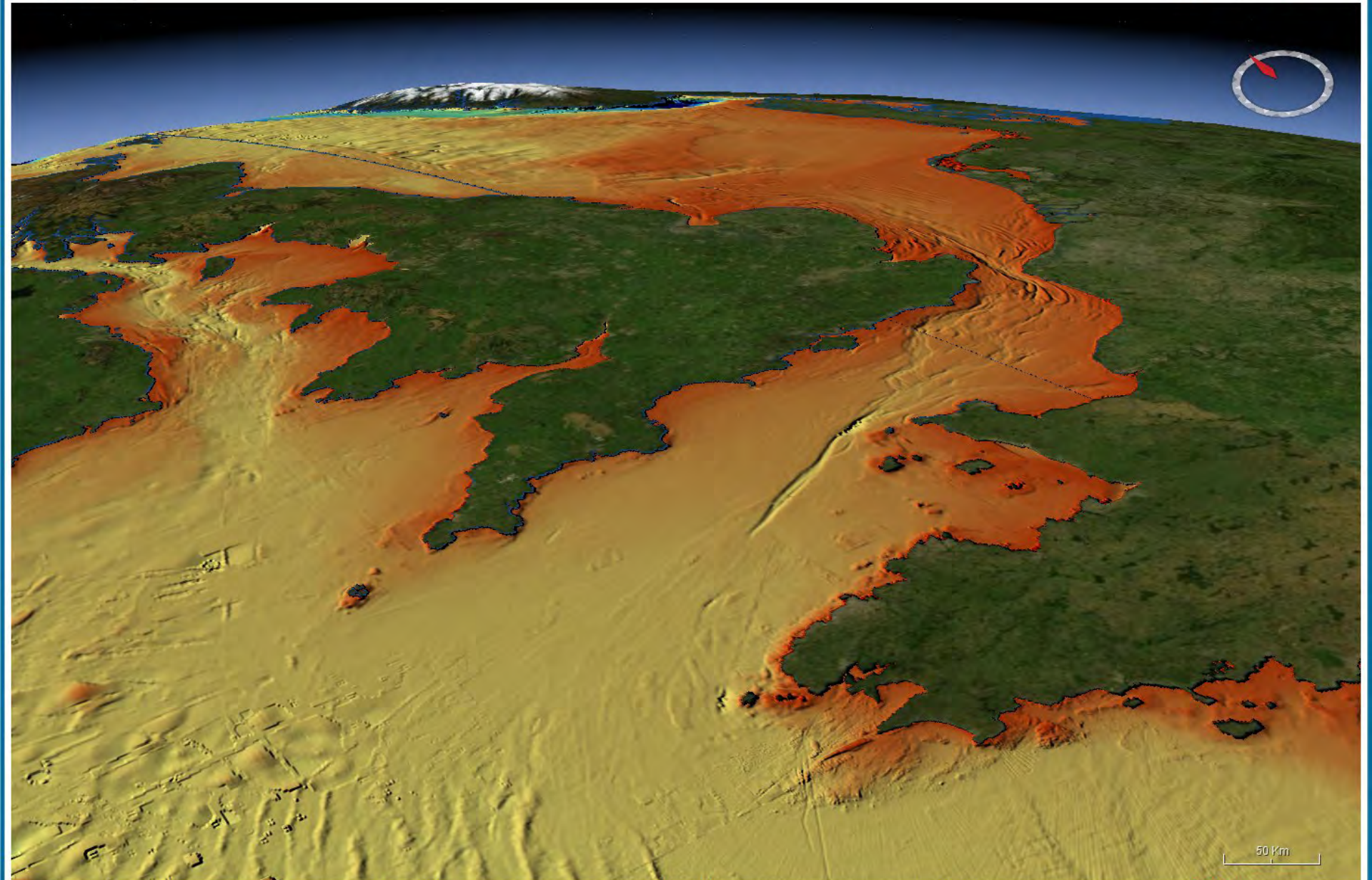
Lon 5,5887°

Elev 23,14 meters

No Network

# Results

Geographic view 



Altitude 399 km

Lat 49,5079°

Lon -4,9367°

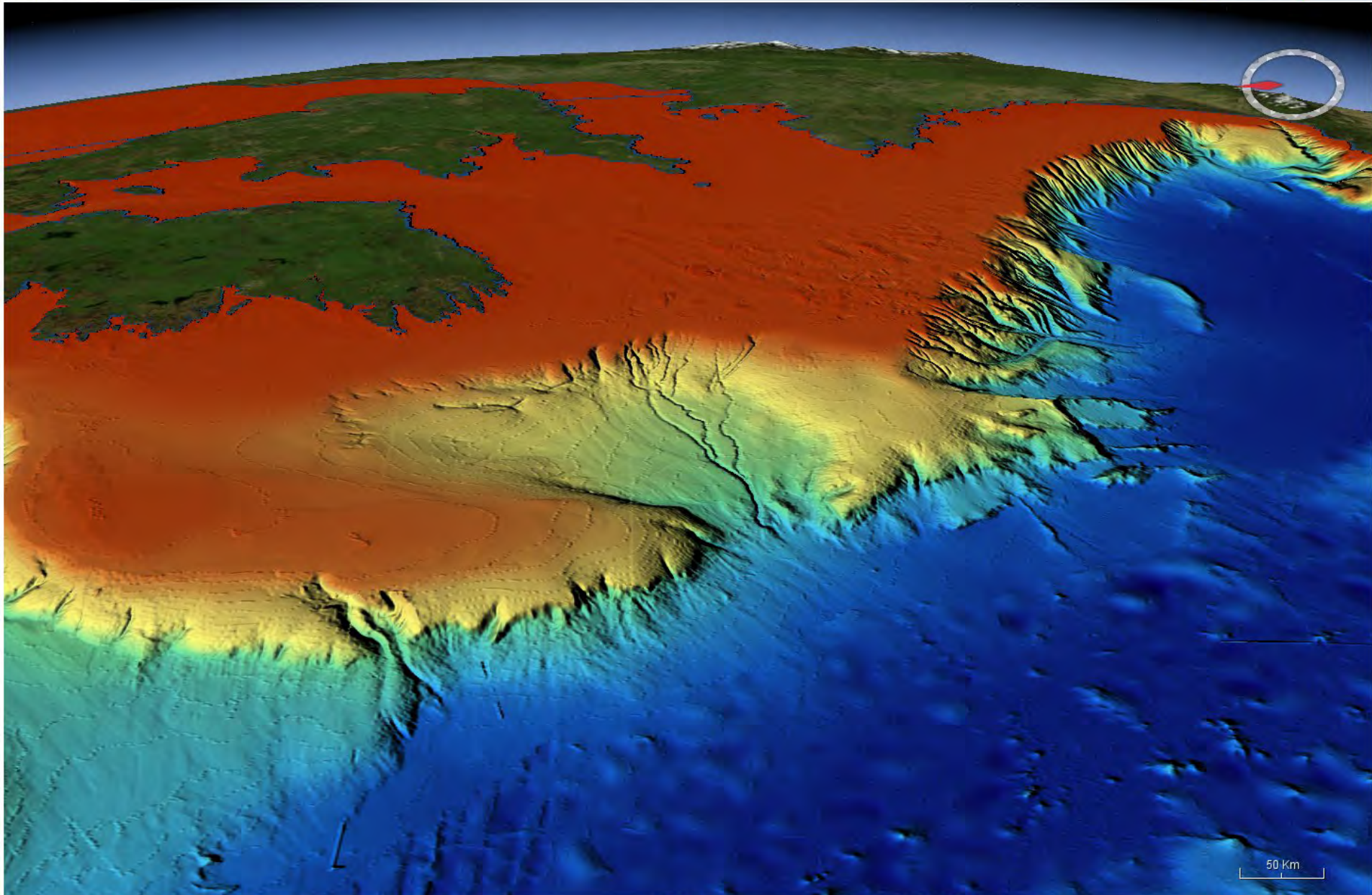
Elev -88,07 meters

No Network

50 Km

# Results

Geographic view



Altitude 484 km

Lat 50,9172°

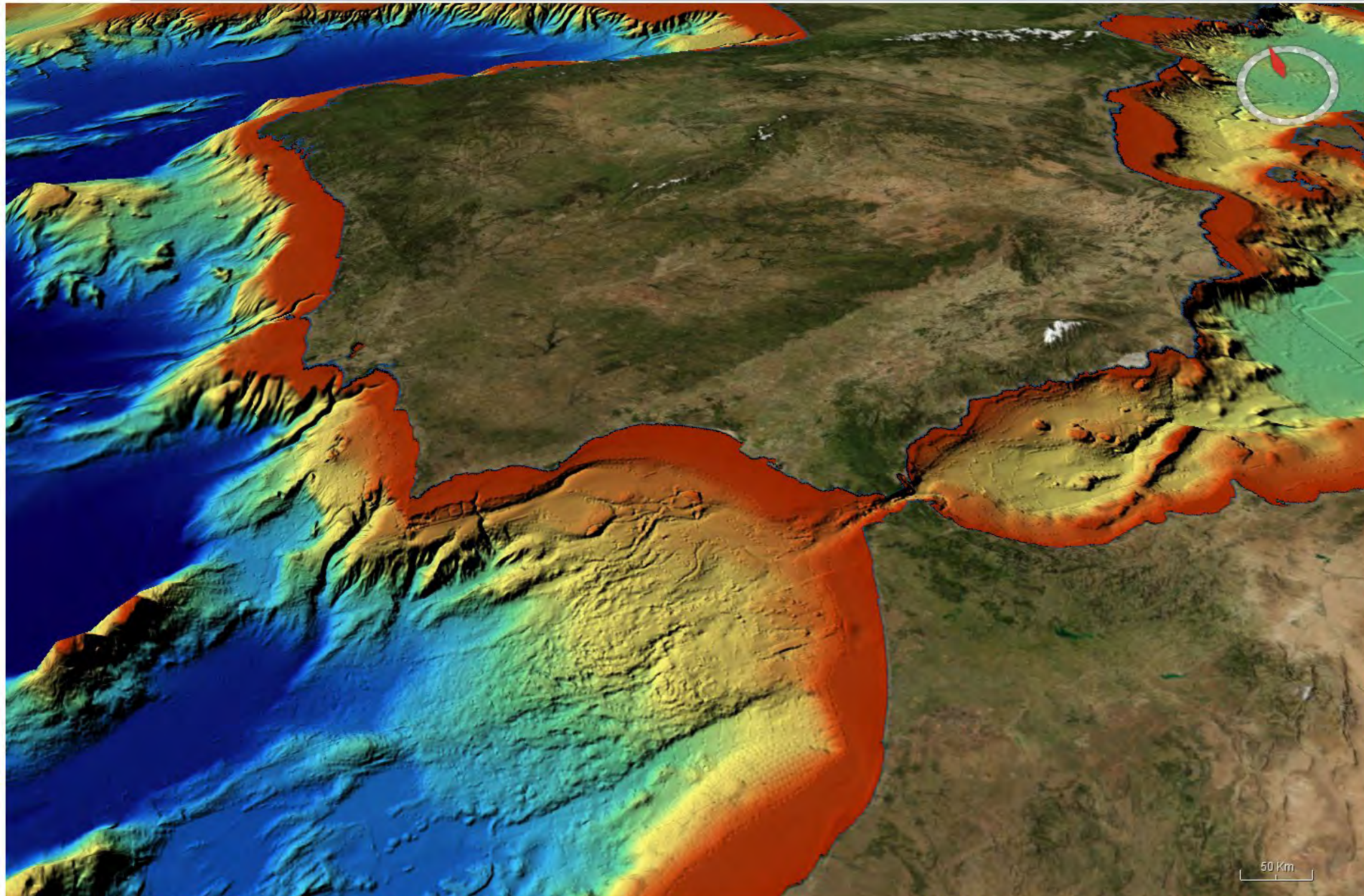
Lon -15,0620°

Elev -3 184,14 meters

No Network

# Results

Geographic view



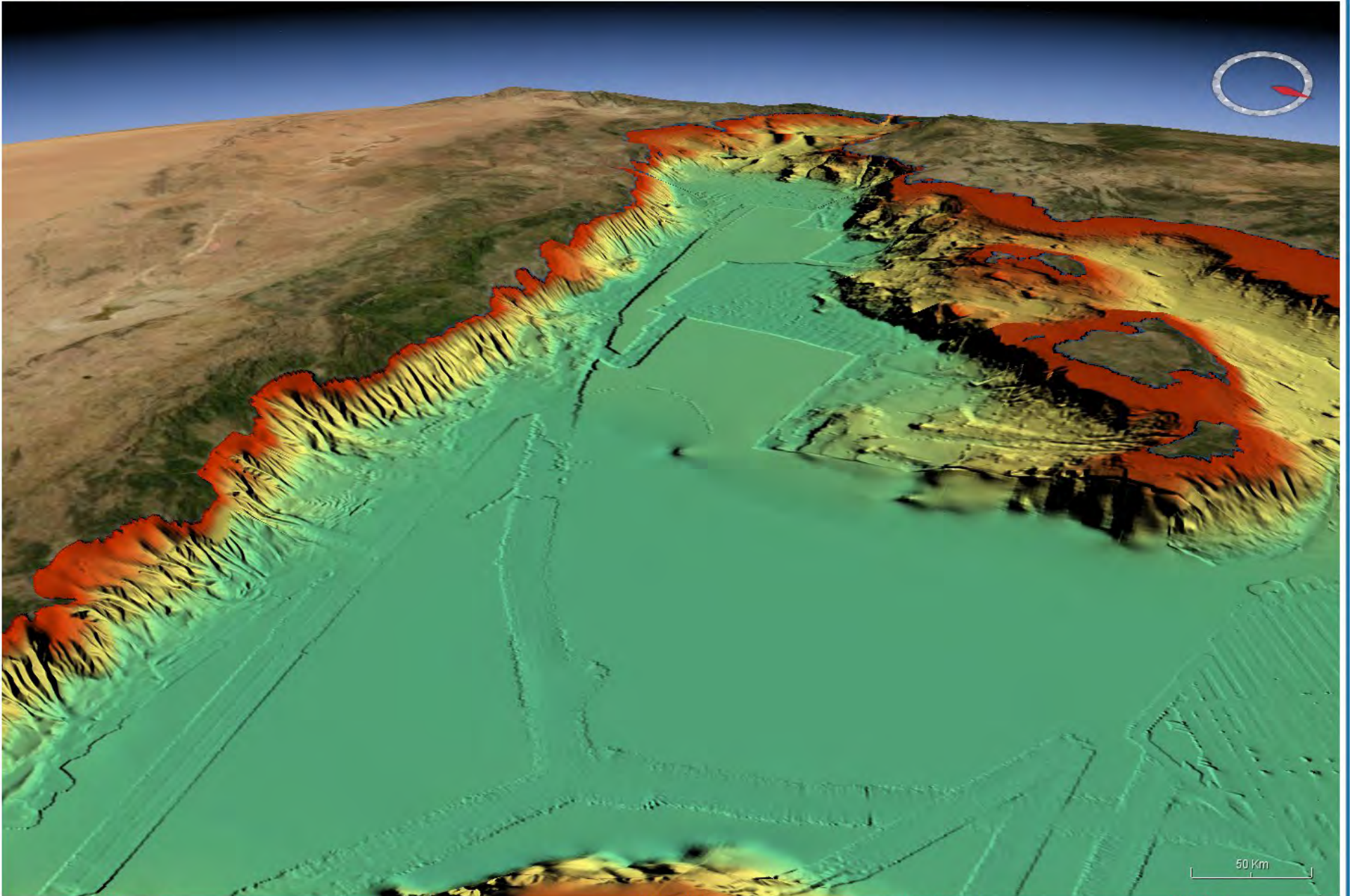
Altitude 735 km

Lat 35,6494°

Lon -5,3890°

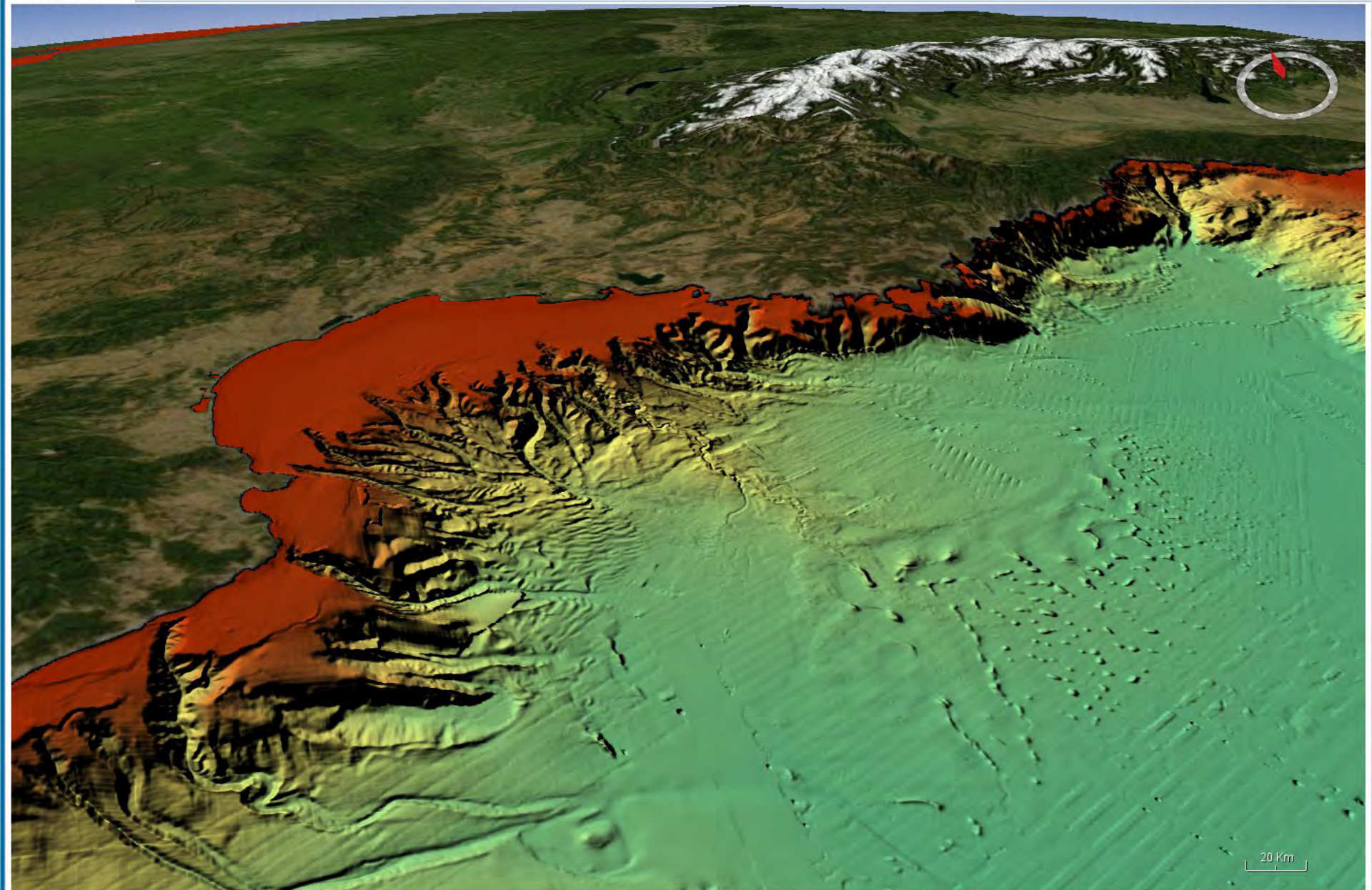
Elev 171,71 meters

No Network



# Results

Geographic view



Altitude 241 km

Lat 40,5195°

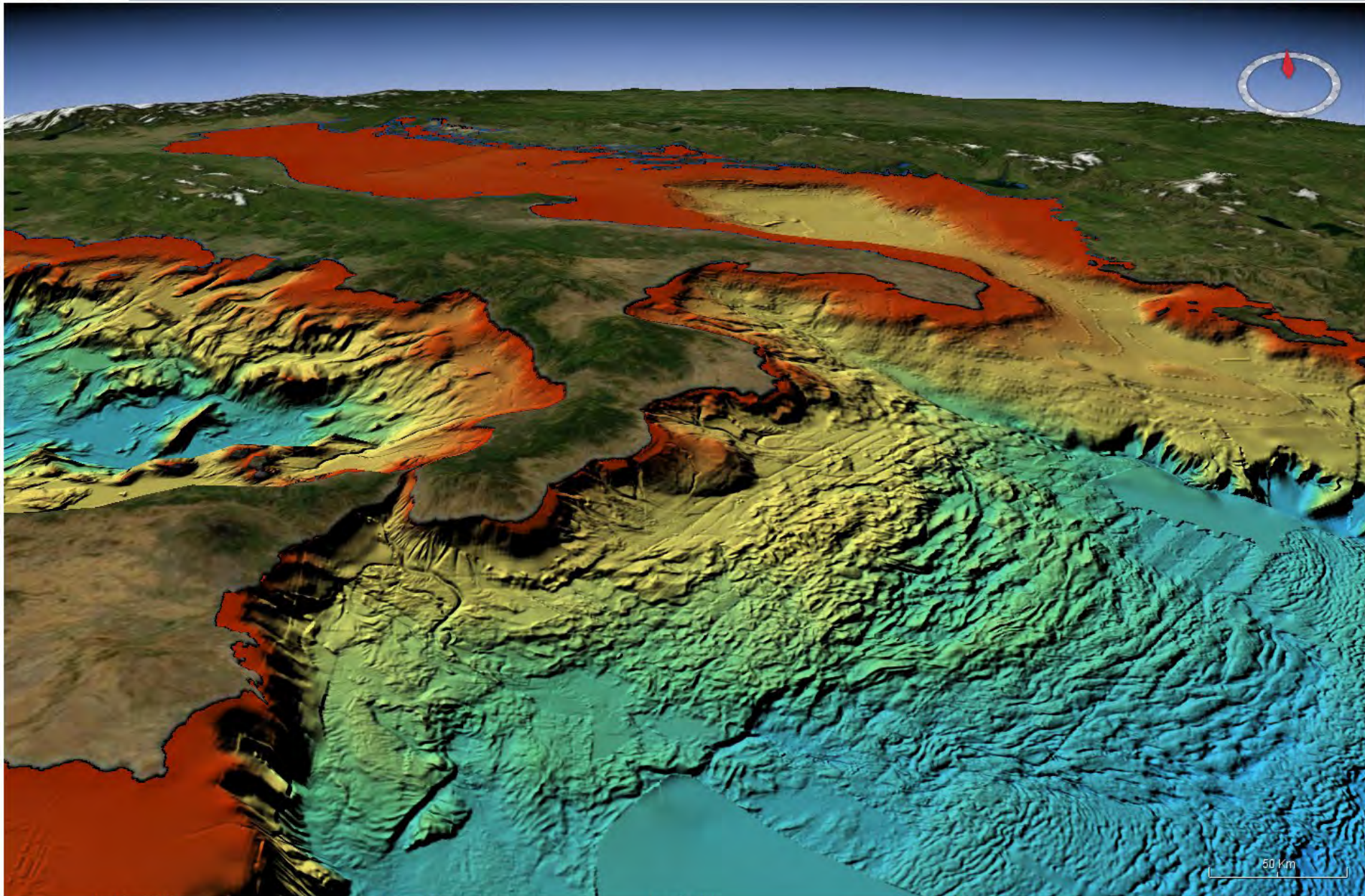
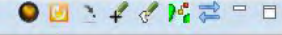
Lon 4,7635°

Elev -2 733,77 meters

No Network

# Results

Geographic view



Altitude 251 km

Lat 36,7952°

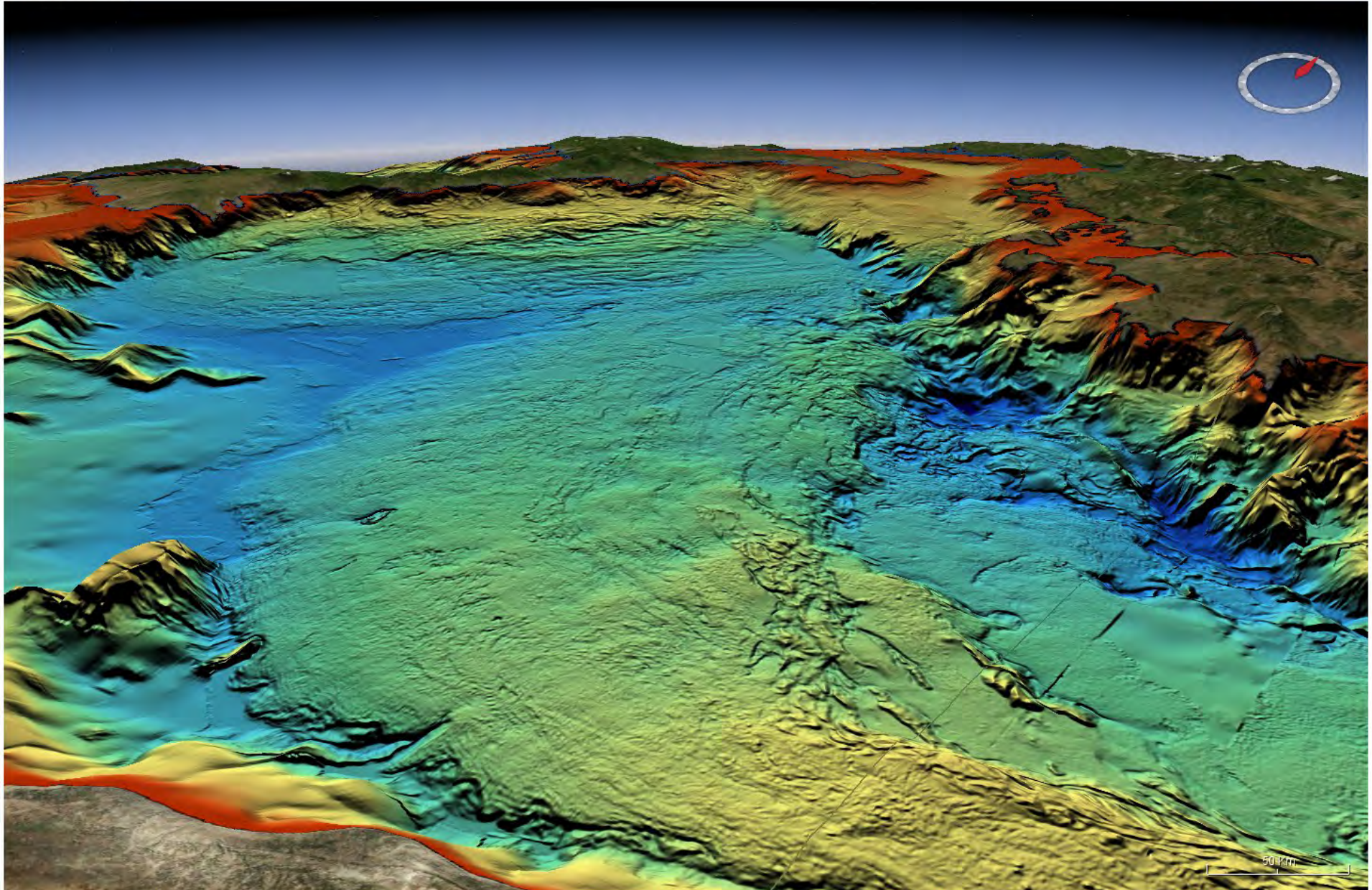
Lon 16,9017°

Elev -3 467,15 meters

No Network

# Results

Geographic view



Altitude 188 km

Lat 33,6601°

Lon 21,3545°

Elev -2 377,45 meters

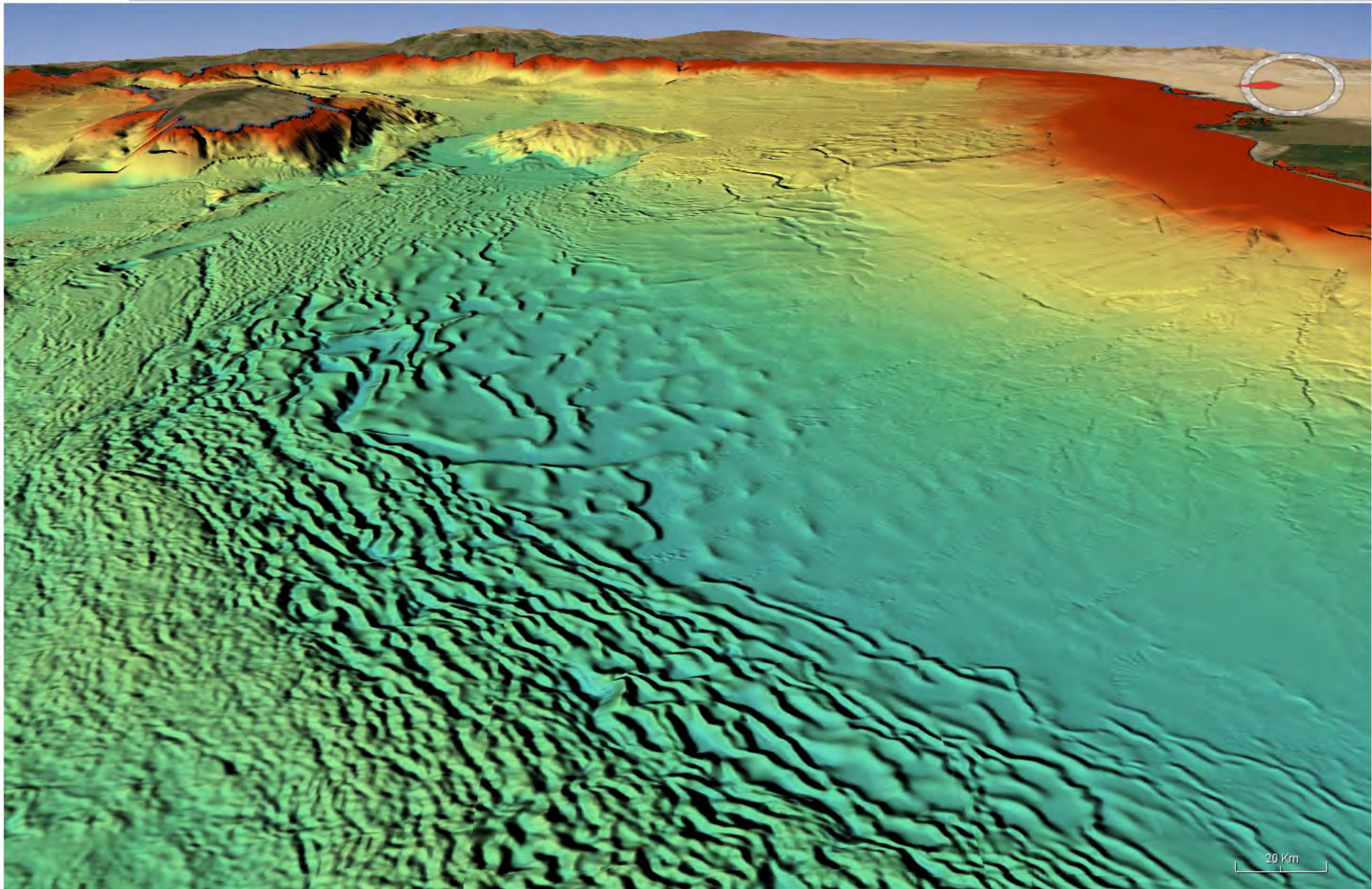
No Network

500m



# Results

Geographic view



Altitude 115 km

Lat 33,6232°

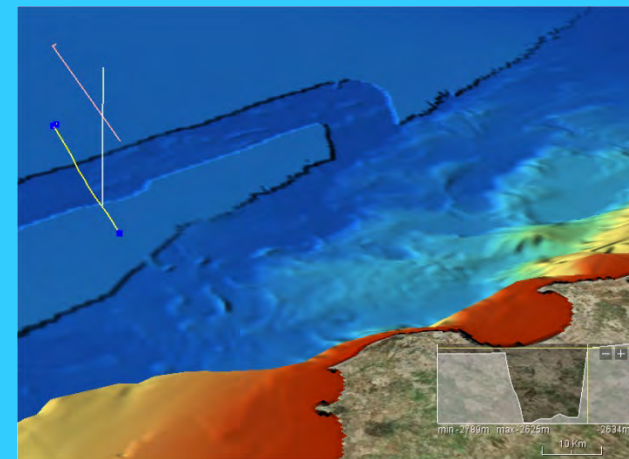
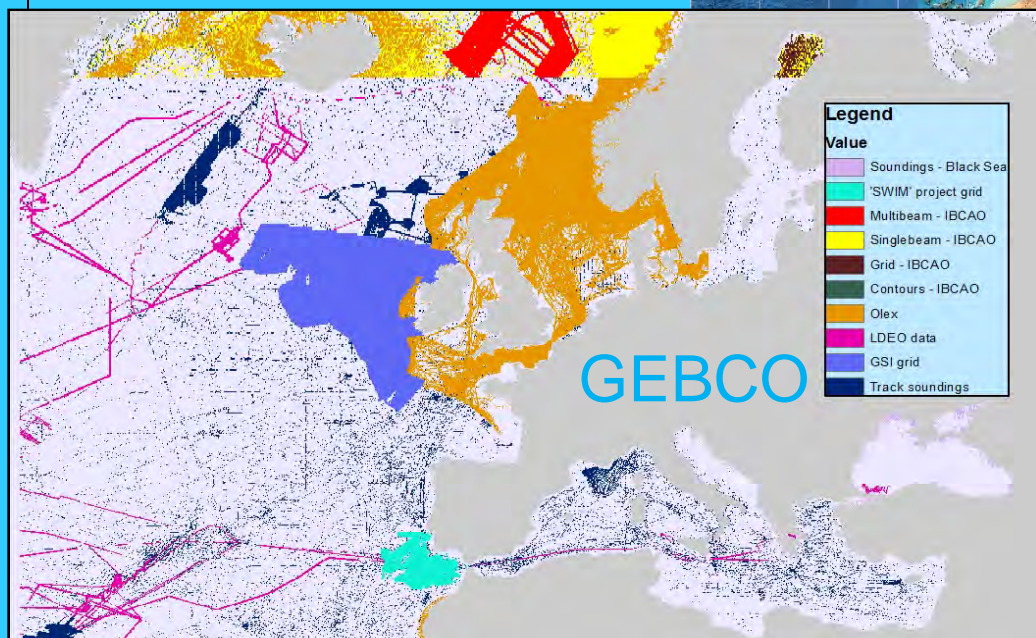
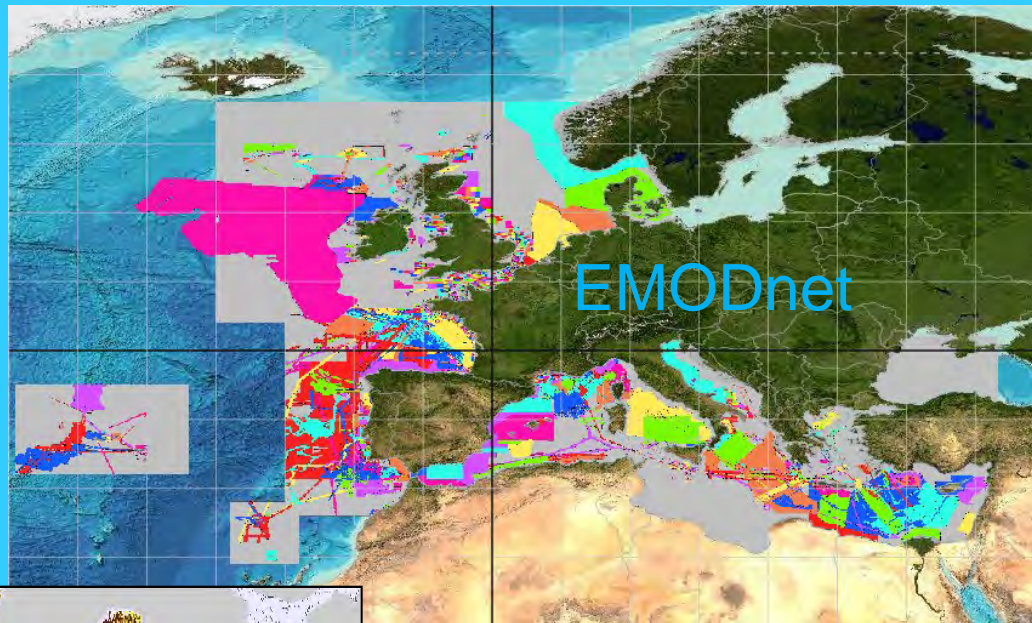
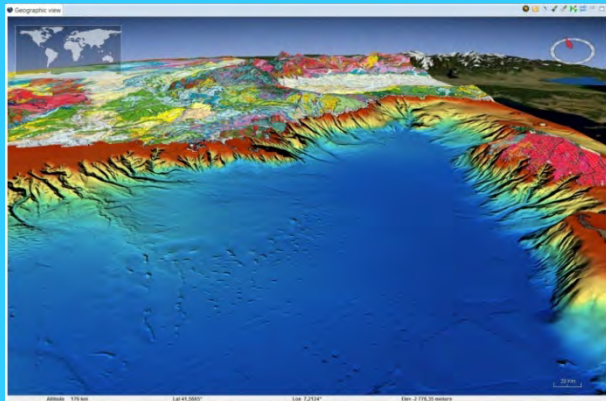
Lon 29,2615°

Elev -3 080,09 meters

No Network

# EMODnet hydrography vs GEBCO

## Survey data coverage



## Offsets

- 3 year duration (2013-2016)
- Increasing the resolution of the DTM from  $\frac{1}{4}$  to  $\frac{1}{8}$  of a minute of lat – lon (ca 225 m\* 225 m) for all sea regions
- Including missing sea basins:
  - Black Sea
  - Baltic Sea
  - Norwegian + Icelandic Sea
  - Canary Islands as part of Macaronesia
- Including new data sets from existing partners
- Including 3 coastal digital terrain models at higher resolution
- Improving the coherence of the integrated DTM (eg North Sea)
- Consortium expanded with new partners and associate partners, including GEBCO editor (BODC) reenforcing cooperation between both projects.

**EMODnet**



European Marine  
Observation and  
Data Network

Pilot portal for Hydrography

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

EMODnet

Pilot approach

Metadata & Data

Data products

Promotion

Partners



# EMODnet hydrography vs GEBCO

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