Briefing on the work of GEBCO

(GENERAL BATHYMETRIC CHART OF THE OCEANS)

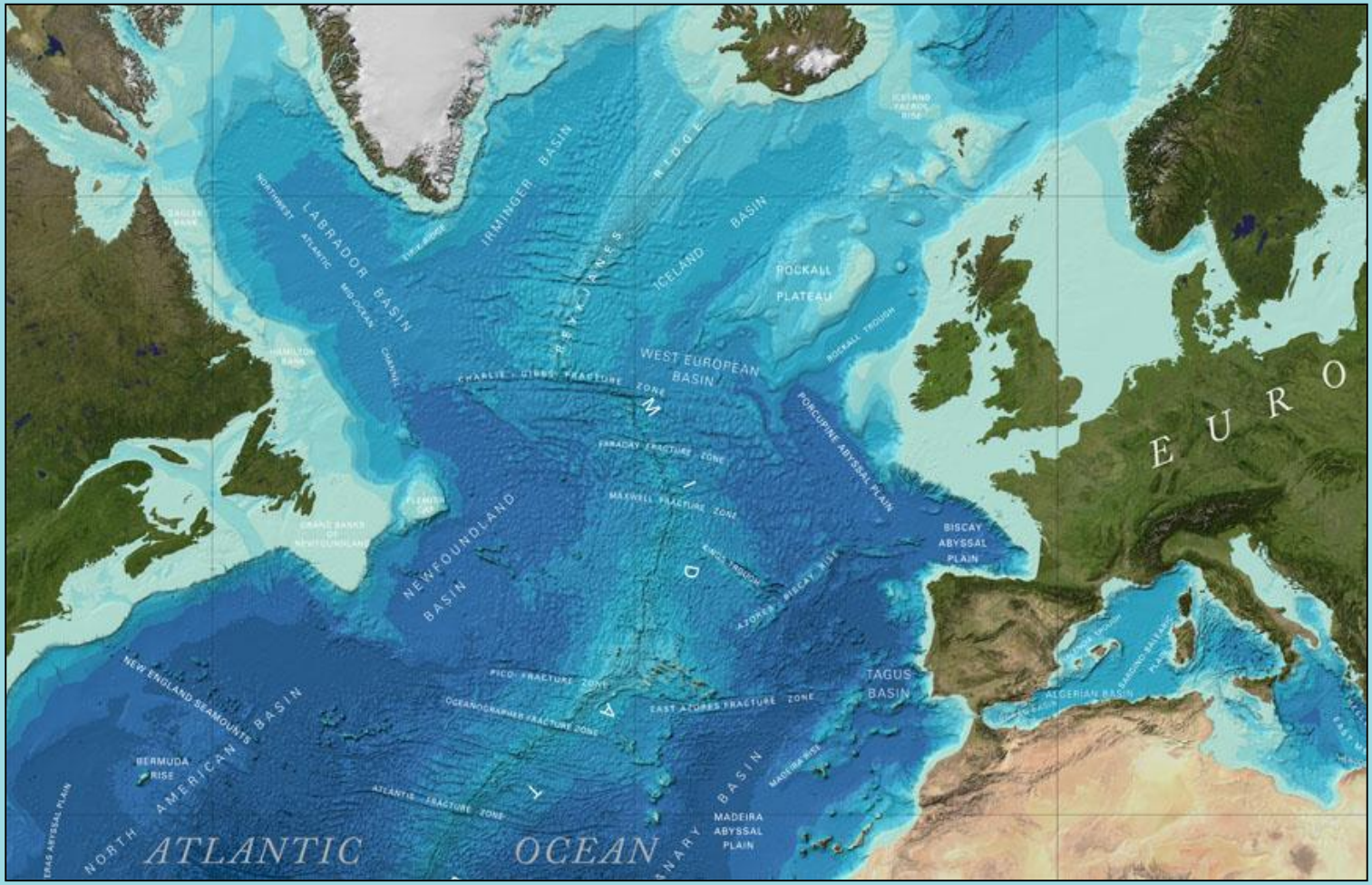
7th ROPME Sea Area Hydrographic Commission Meeting, Muscat, Oman
20 - 22 February 2017

What is GEBCO?

The General Bathymetric Chart of the Oceans (GEBCO) (see www.gebco.net)

- Aims to provide the most authoritative, publicly-available bathymetric data sets for the world's oceans
- Operates under the joint auspices of the
  - International Hydrographic Organization (IHO), and
  - Intergovernmental Oceanographic Commission (IOC) of UNESCO
- First GEBCO paper chart series initiated in 1903
- Forum for Future Ocean Floor Mapping (June 2016): www.iho.int/mtg_docs/com_wg/GEBCO/FOFF/index.html

What is GEBCO?



Imagery developed from the GEBCO global bathymetric grid (showing the shape of the sea floor in the North Atlantic Ocean) and gazetteer of undersea feature names

General Bathymetric Chart of the Oceans | GEBCO | United Nations Educational, Scientific and Cultural Organization | Intergovernmental Oceanographic Commission

GEBCO's organisational structure

- GEBCO is led by a Guiding Committee consisting of five IHO-appointed members; five IOC-appointed members; Sub-committee Chairs and the Director of the IHO-DCDB

- It has 3 sub-committees and a number of working groups:
  - Sub-Committee on Undersea Feature Names (SCUFN)
  - Technical Sub-Committee on Ocean Mapping (TSCOM)
  - Sub-Committee on Regional Undersea Mapping (SCRUM)
  - Working groups on Outreach and the IHO-IOC GEBCO Cook Book

www.gebco.net/about_us/committees_and_groups/

Regional mapping work

GEBCO has setup the Sub-Committee on Regional Undersea Mapping (SCRUM) to:

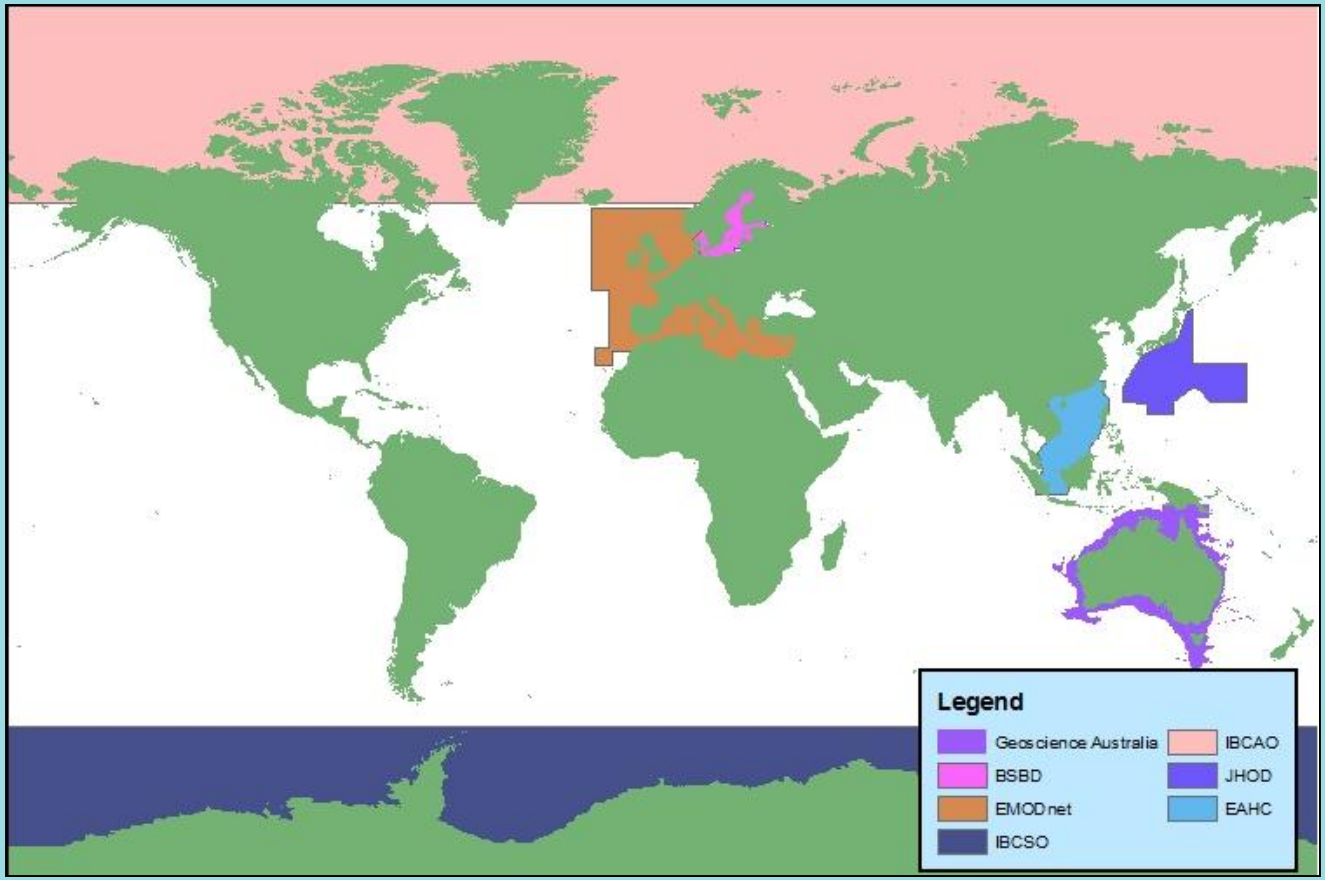
- Build a closer collaboration with regional mapping efforts and coordinate, as well as encourage, the incorporation of their compilations into GEBCO.

- The Global GEBCO grid is continuously updated in part from these regional grids, benefiting greatly from their local knowledge and expertise.

www.gebco.net/regional_mapping/mapping_projects/

Regional mapping work

Coverage of some of the regional compilations included in the current GEBCO Grid



GEBCO's products

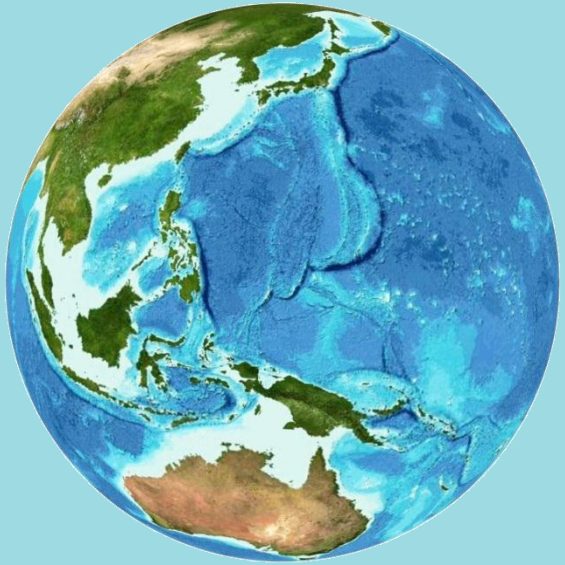
Our bathymetric data sets and products:

- Global gridded bathymetric data set (30 arc-second interval)
- GEBCO Gazetteer of Undersea Feature Names
- GEBCO Digital Atlas
- Grid viewing software
- Printable maps
- Web Map Service (WMS)
- IHO-IOC GEBCO Cook Book

www.gebco.net/data_and_products/

GEBCO's products: global bathymetric grid

The GEBCO Grid is a global terrain model at 30 arc-second intervals:

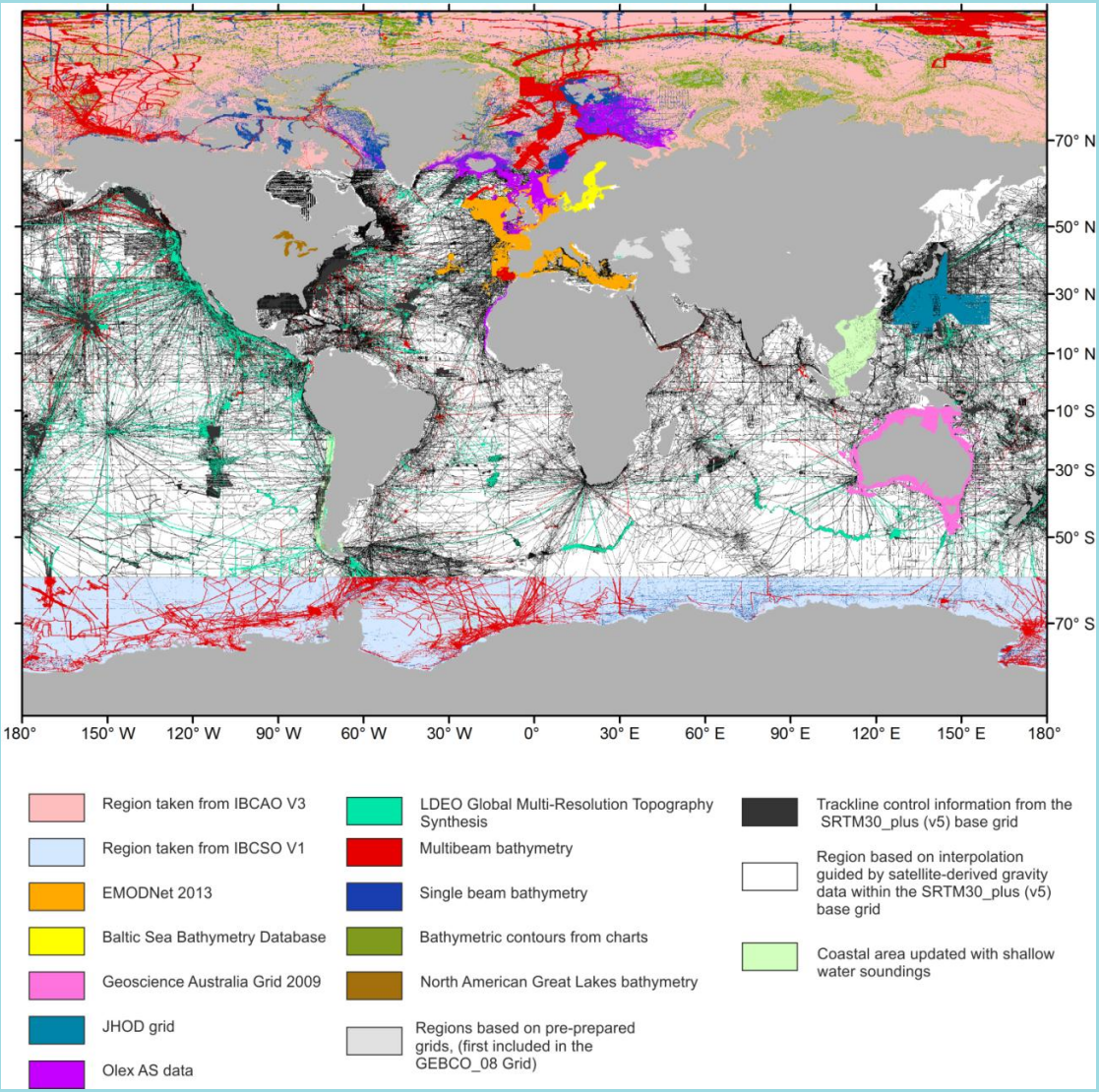


- Largely based on a database of ship-track soundings with interpolation between soundings guided by satellite-derived gravity data
- Includes regional grids which may be based on different interpolation models
- Accompanied by a Source Identifier Grid showing which cells are based on soundings or existing grids and which are interpolated

GEBCO's grids are made available for non-navigational purposes:

www.gebco.net/data_and_products/gridded_bathymetry_data/

GEBCO's products: Source Identifier Grid



The GEBCO Source Identifier (SID) Grid:

Shows the source of depth value in each grid cell, i.e. if it is based on trackline data; pre-existing grids or if it is based on interpolation

Filling the data gaps

- Raising awareness of the ‘data gaps’ to encourage data collection in these regions
- Encouraging organizations to make their bathymetric data sets easily discoverable and accessible, either directly or by contributing data to international publically-available databases such as the IHO Data Center for Digital Bathymetry (IHO-DCDB)
- Crowd-sourced bathymetry (CSB) initiatives – such as the IHO CSB Working Group
- GEBCO initiative to request shallow water bathymetry data extracted from Electronic Navigation Charts from the Hydrographic community

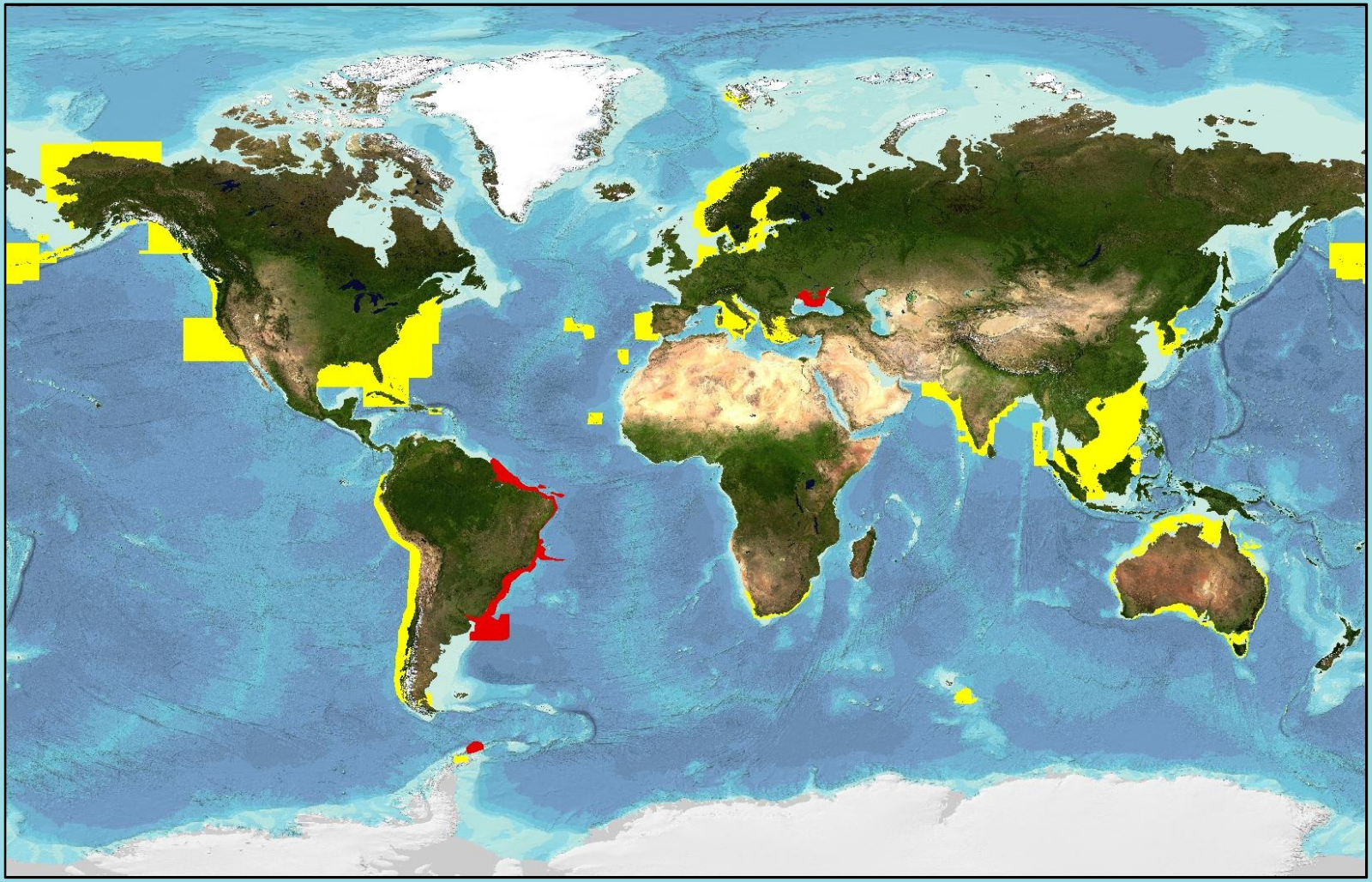
Shallow water bathymetry data

- To more accurately model the shape of the ocean floor in all areas and serve a wider user community, GEBCO is striving to improve its gridded bathymetric datasets in shallower waters

- In 2006 a request was made to IHO Member States to provide ENC data (usage bands 2 and 3) to GEBCO to help update its global model

- New request to IHO MS for ENC data sent out in March 2016 (circular letter 11/2016)

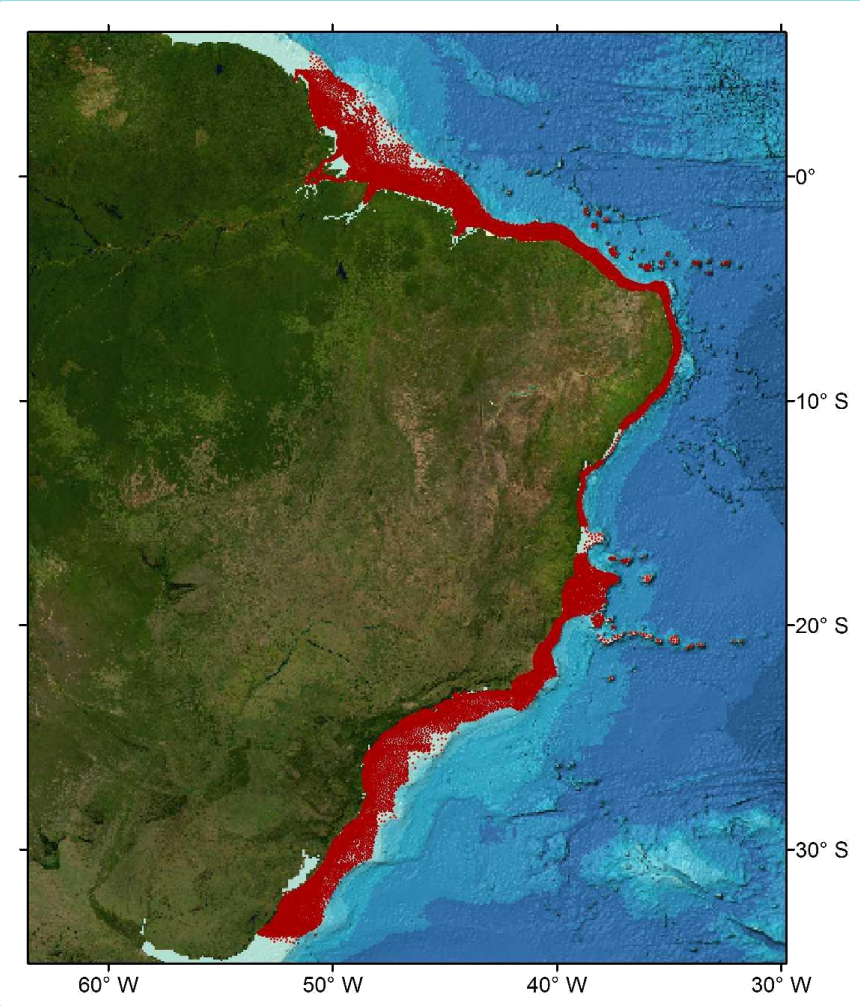
Shallow water bathymetry – ENC data



ENC data coverage (usage bands 2 & 3) provided by IHO MS and organizations, to date, to GEBCO for grid updating work after calls in 2006 (yellow) and 2016 (red),

Shallow water bathymetry – ENC data

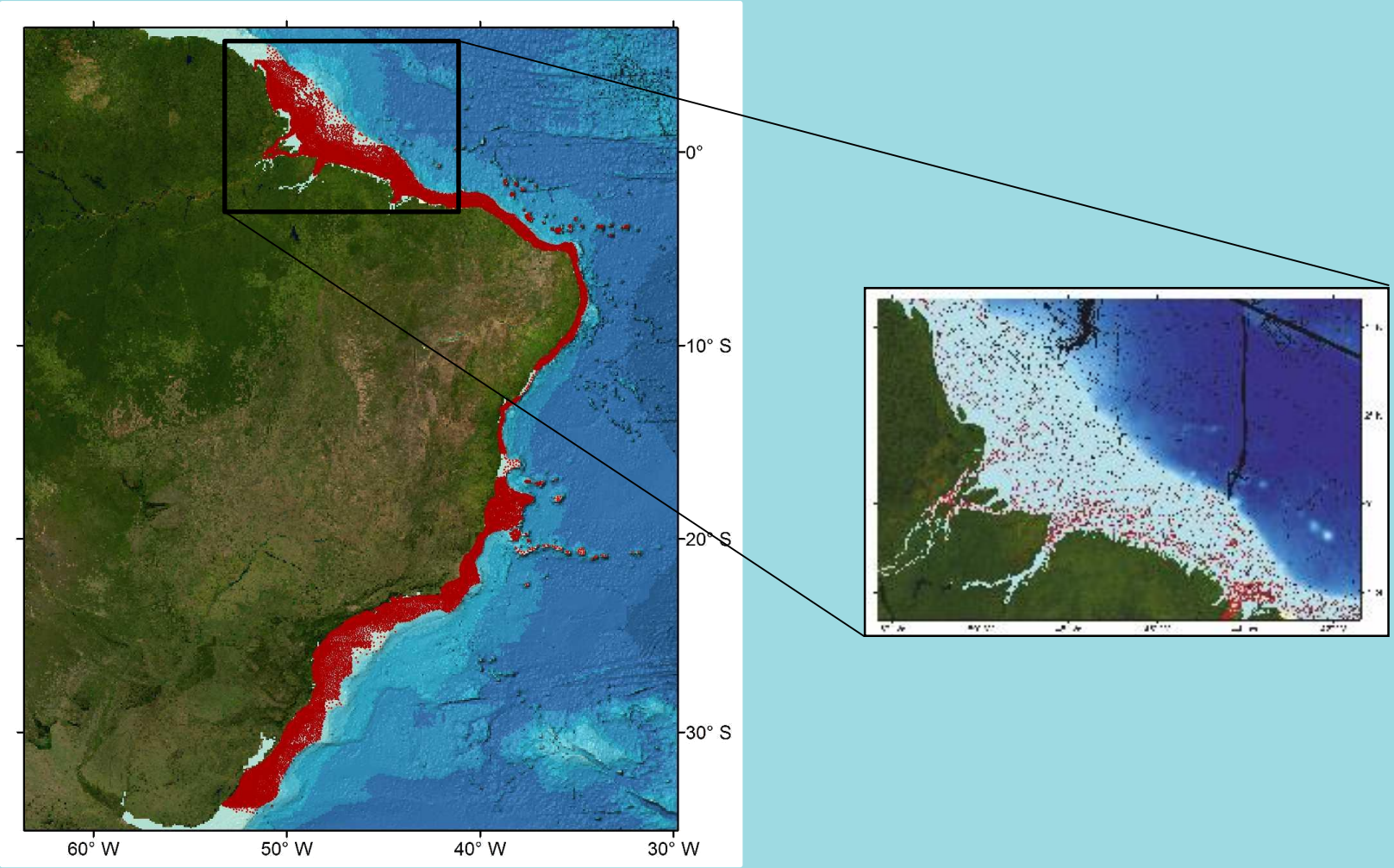
Data for waters off Brazil



Soundings points extracted from ENCs recently supplied to GEBCO for the waters off Brazil

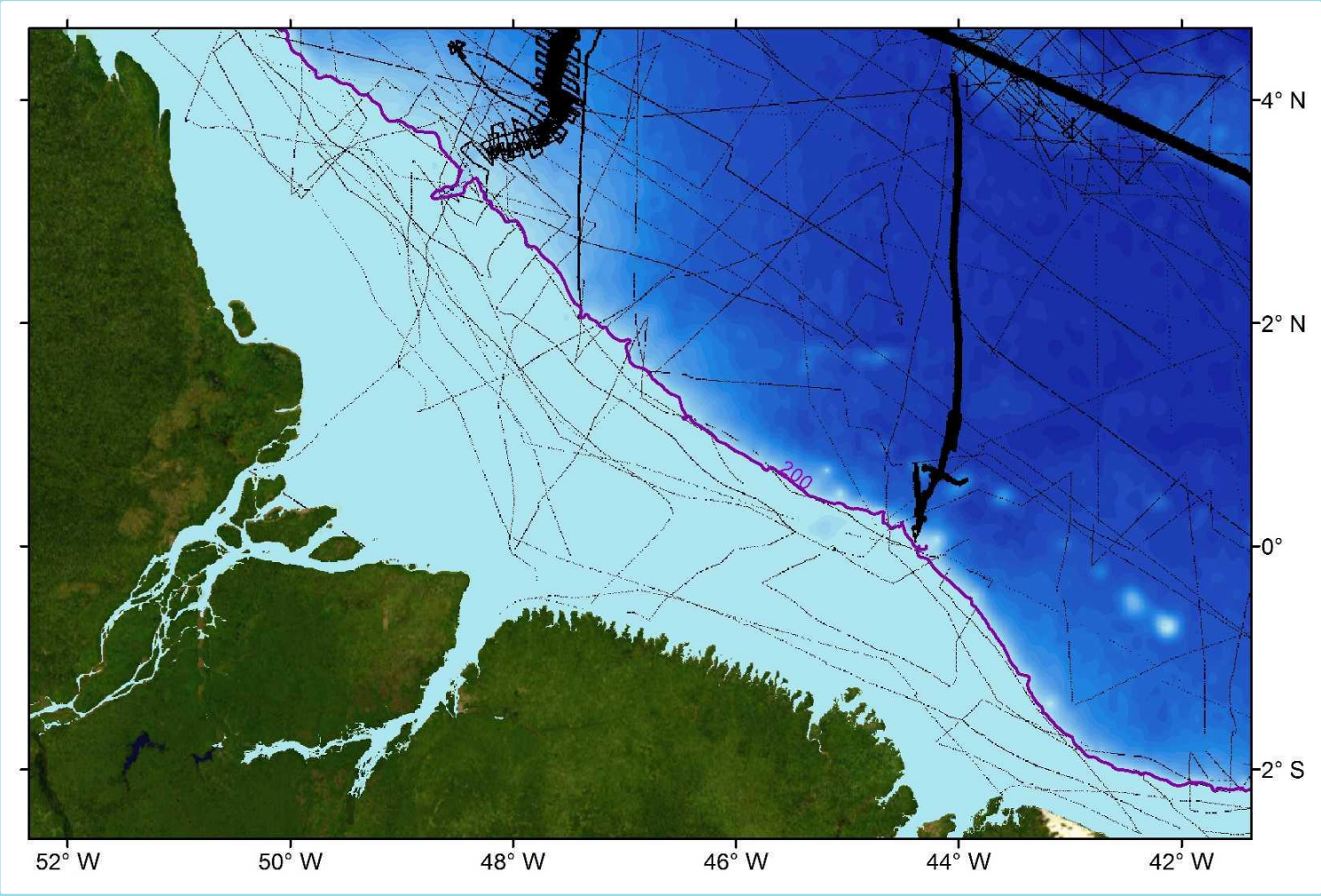
Shallow water bathymetry – ENC data

Data for waters off Brazil



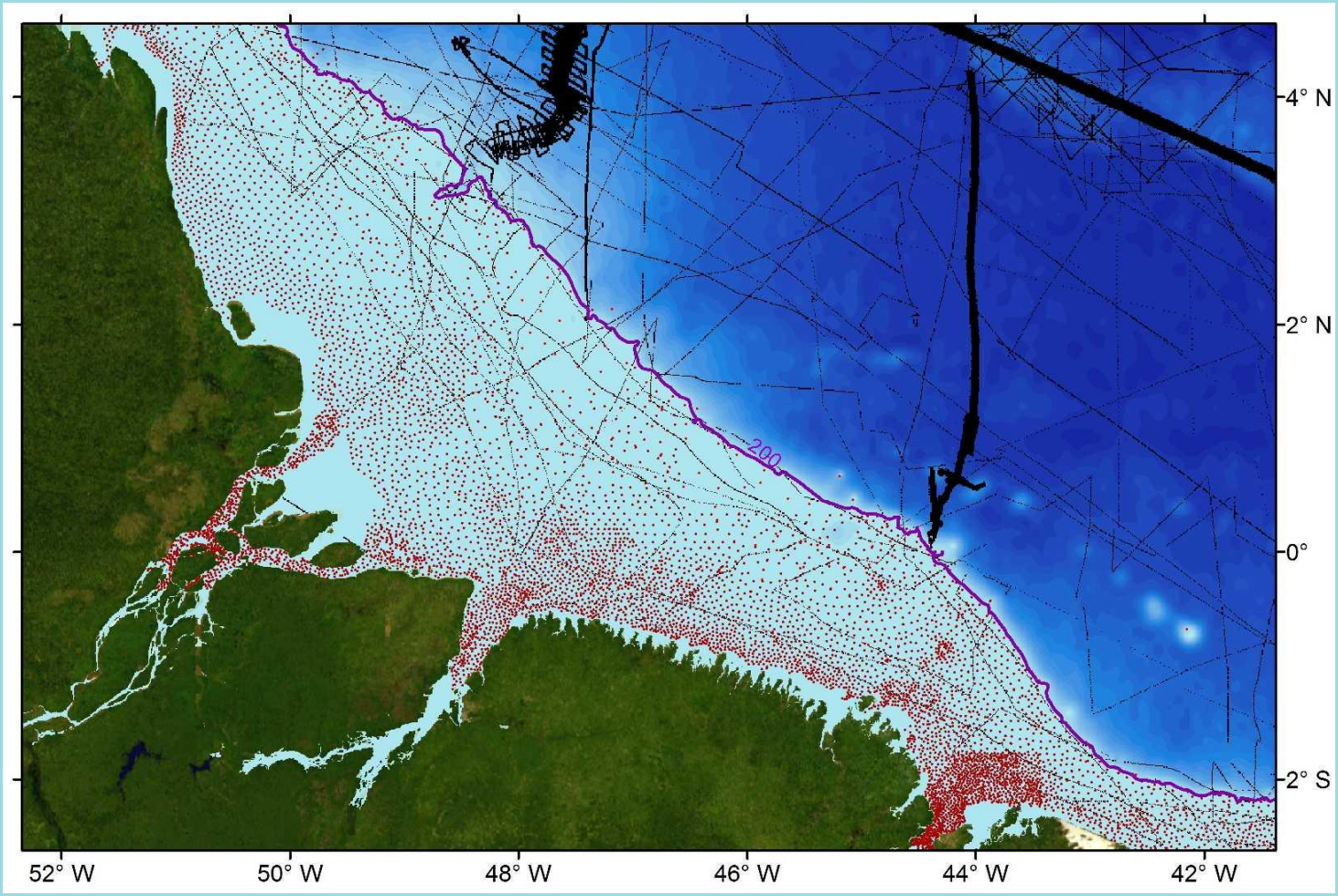
Shallow water bathymetry data

Current GEBCO trackline coverage (black lines)



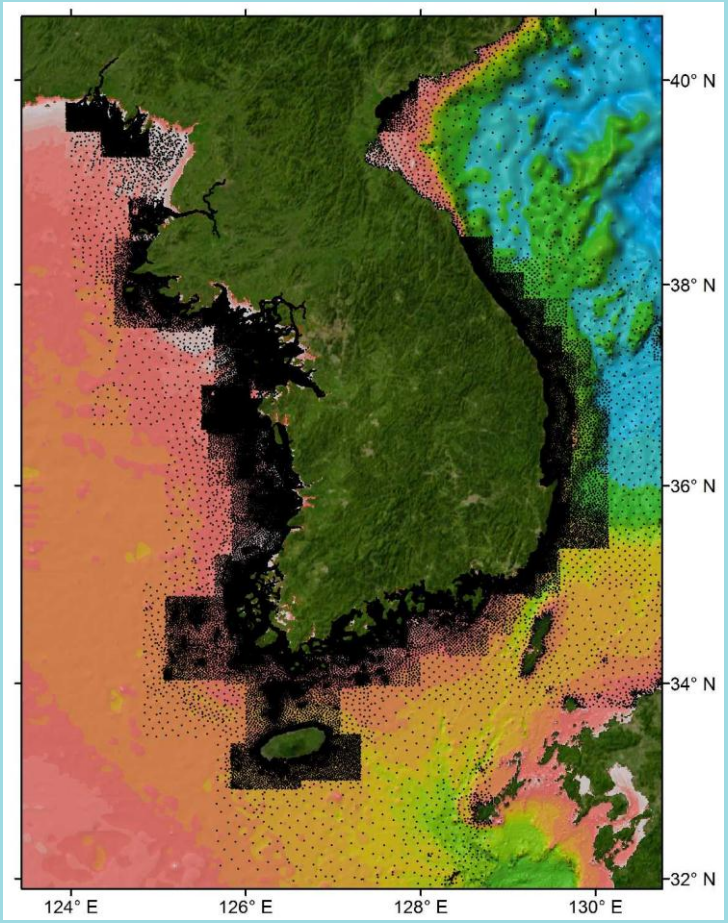
Shallow water bathymetry data

GEBCO trackline coverage (black lines), plus ENC soundings (red)

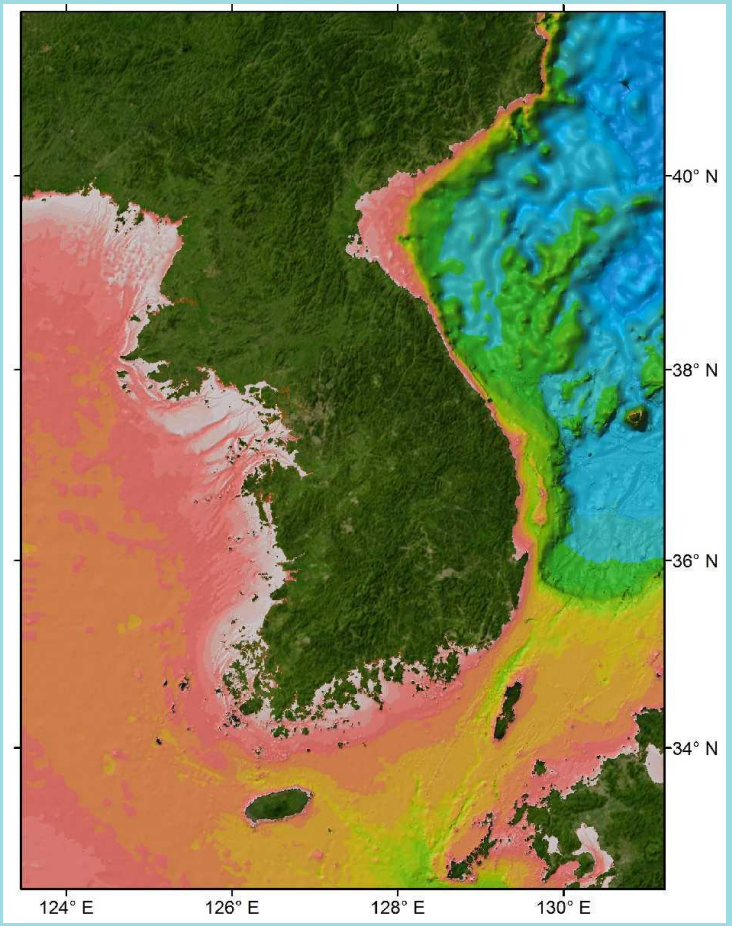


Shallow water bathymetry data

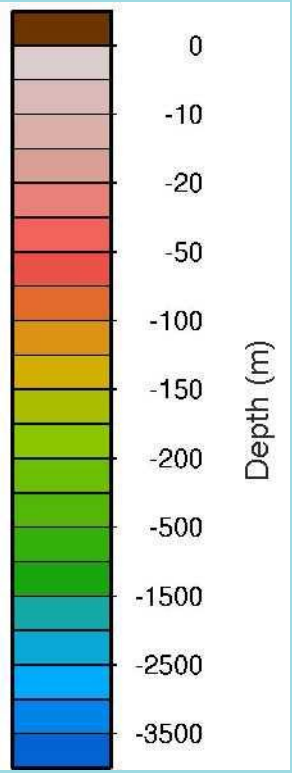
Region off the Korean Peninsula



Coverage of ENC soundings supplied to GEBCO

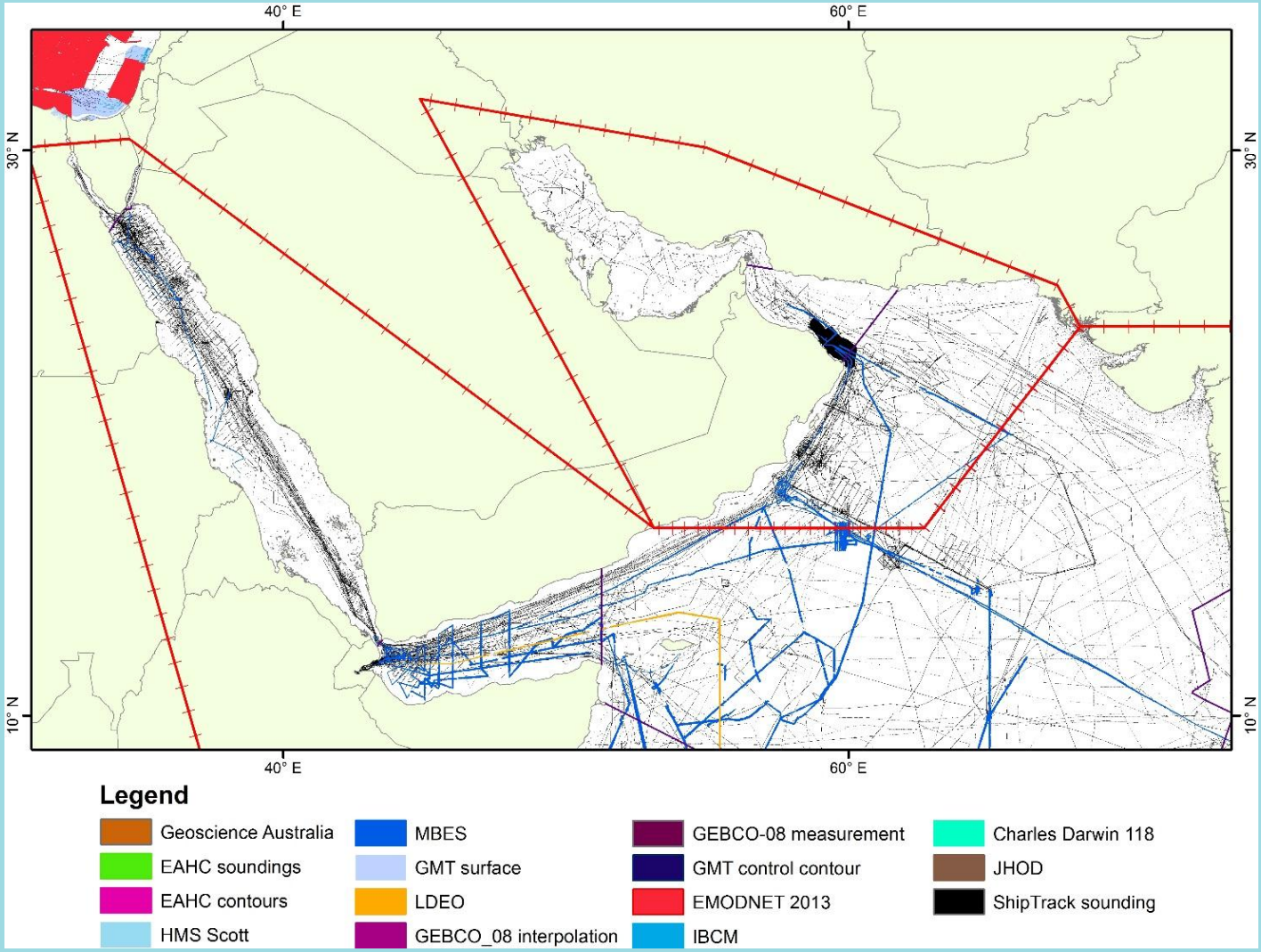


GEBCO_2014 Grid



GEBCO_2014 Grid

- GEBCO Source Identifier Grid in part of the ROPME area → showing the coverage of data sets contributing to the GEBCO_2014 Grid



Capacity-building initiative:

The Postgraduate Certificate in Ocean Bathymetry

Designed to train a new generation of scientists and hydrographers in ocean bathymetry

is funded by:

The Nippon Foundation of Japan

www.nippon-foundation.or.jp/en/

and taught at:

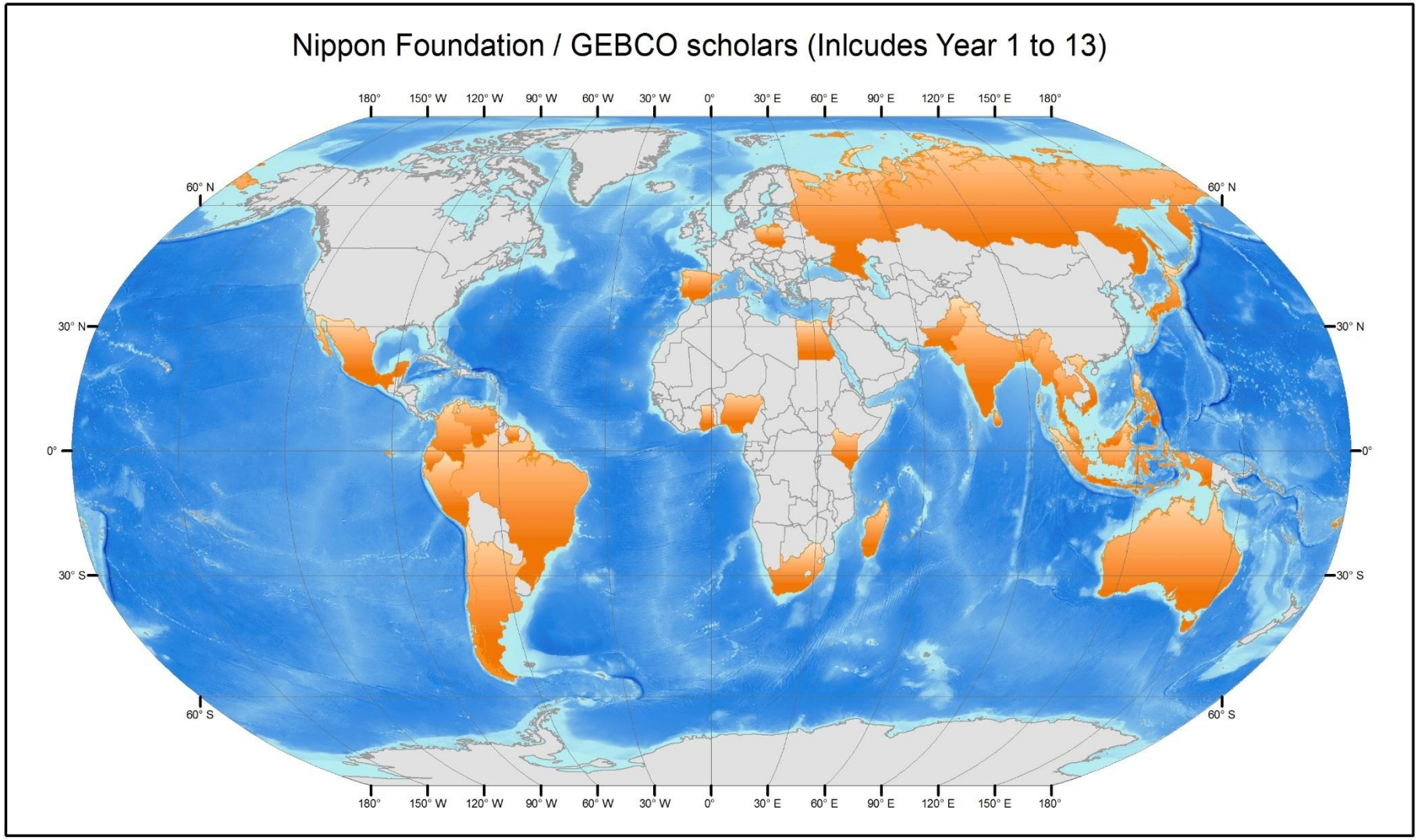
The **Center for Coastal and Ocean Mapping / Joint Hydrographic Center; University of New Hampshire, USA**

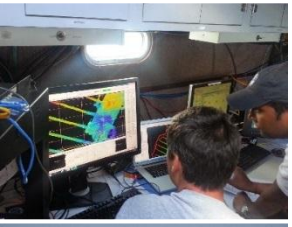
SEE CIRCULAR LETTER 13/2017 - 09 February 2017





78 scholars from 35 coastal states over last 13 years






Training Program Content

Fall Semester
(August-December)

- Fundamentals of Ocean Mapping I
- Applied Tools in Ocean Mapping
- Geological Oceanography
- Elective (Math for Mapping etc.)

J-term

- Visit NGDC in Boulder, Co.
- Software training (e.g. Fledermaus & QinSy)

Spring Semester
(January-May)

- Fundamentals of Ocean Mapping II
- Bathymetric Spatial Analysis
- Geodesy and Positioning for Ocean Mapping
- Seamanship and Marine Weather
- Electives (LOS, Coastal Processes etc.)

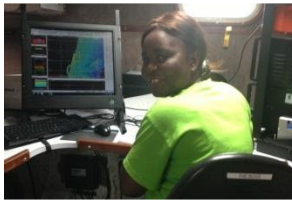
Summer
(June-August)

- Students will take the Hydrographic Field Course

Lab Visit & Cruise

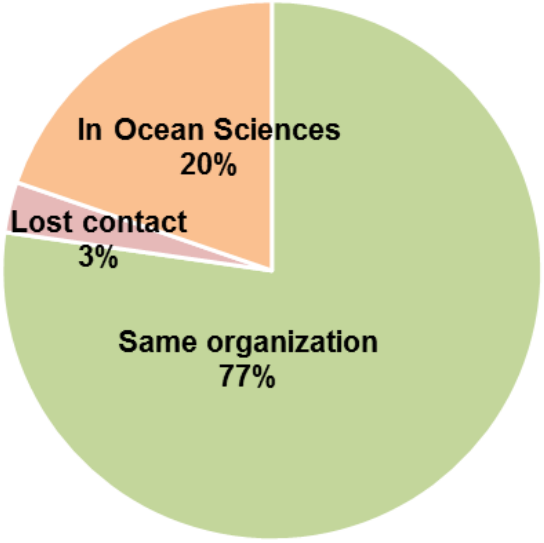
- The working visit to a research organization and / or a cruise over the summer is selected by student and their home organization in a field of mutual interest.
- The visit aims to round out the students training, to help them build networks and to deepen some of their newly-acquired theoretical knowledge. This training includes familiarization with the programs the visited organization is engaged in, as well as some directed work under supervision.

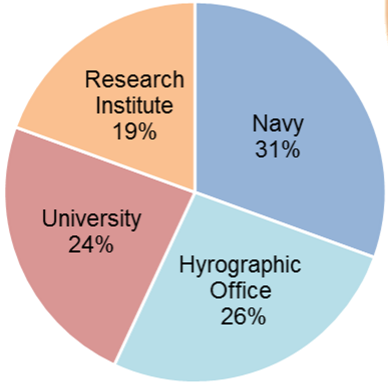


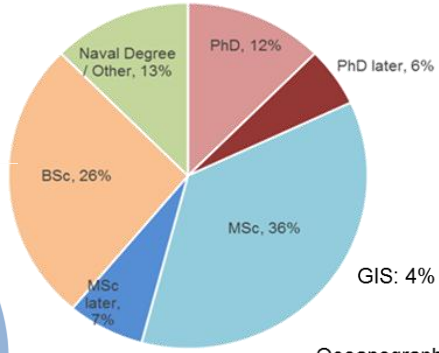



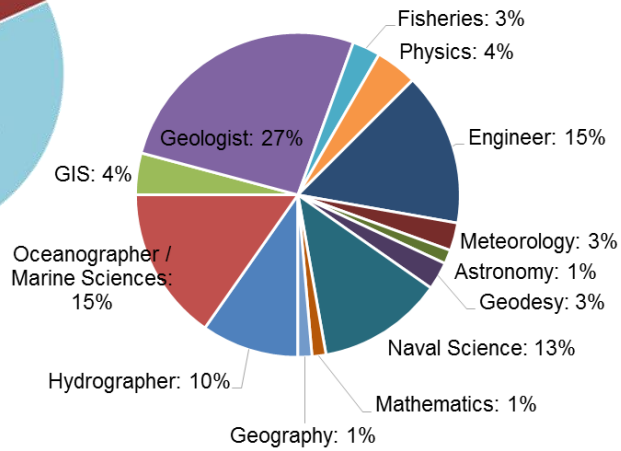
Measure our success?

13 years with alumni from 48 Different Organizations from 35 Coastal States









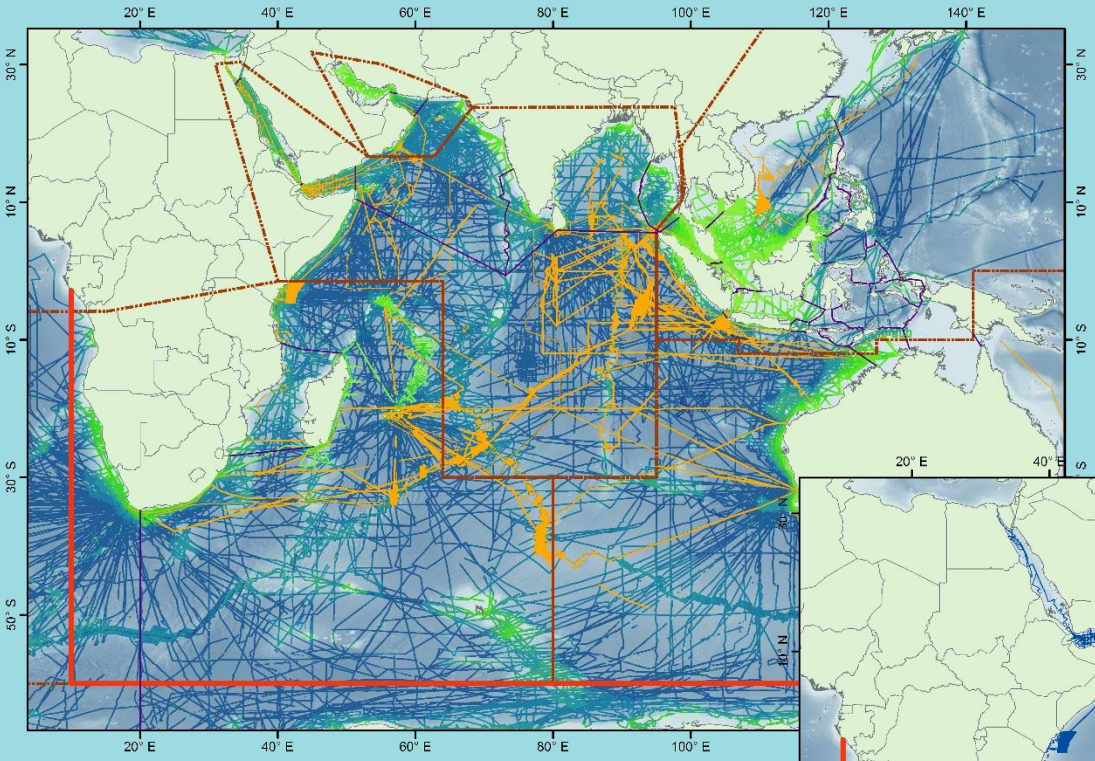
Nippon Foundation / GEBCO Indian Ocean Bathymetric Compilation

- Assemble all available bathymetric data from the different research cruises and hydrographic surveys undertaken in the Indian Ocean
- Publish a regional bathymetric grids that will also be integrated into the next world ocean map and grid by GEBCO
- **UTILISE SCHOLARS NETWORKS (39 alumni from relevant states)**

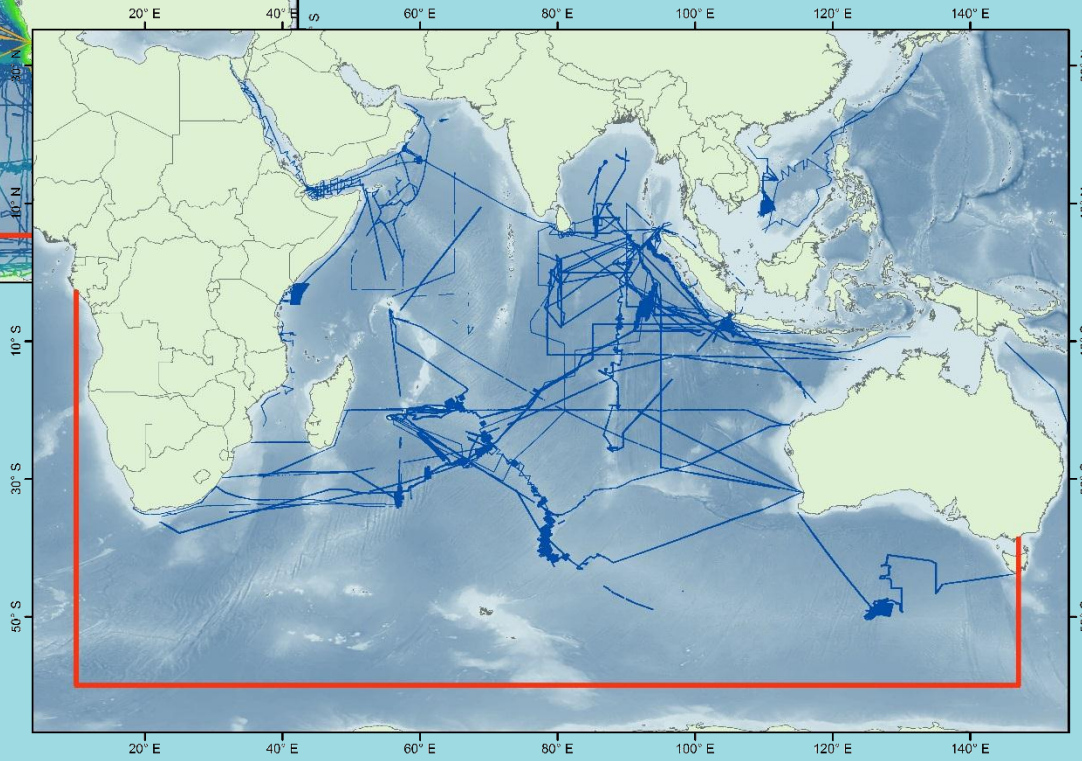



Current status of Indian Ocean Bathymetric Compilation:

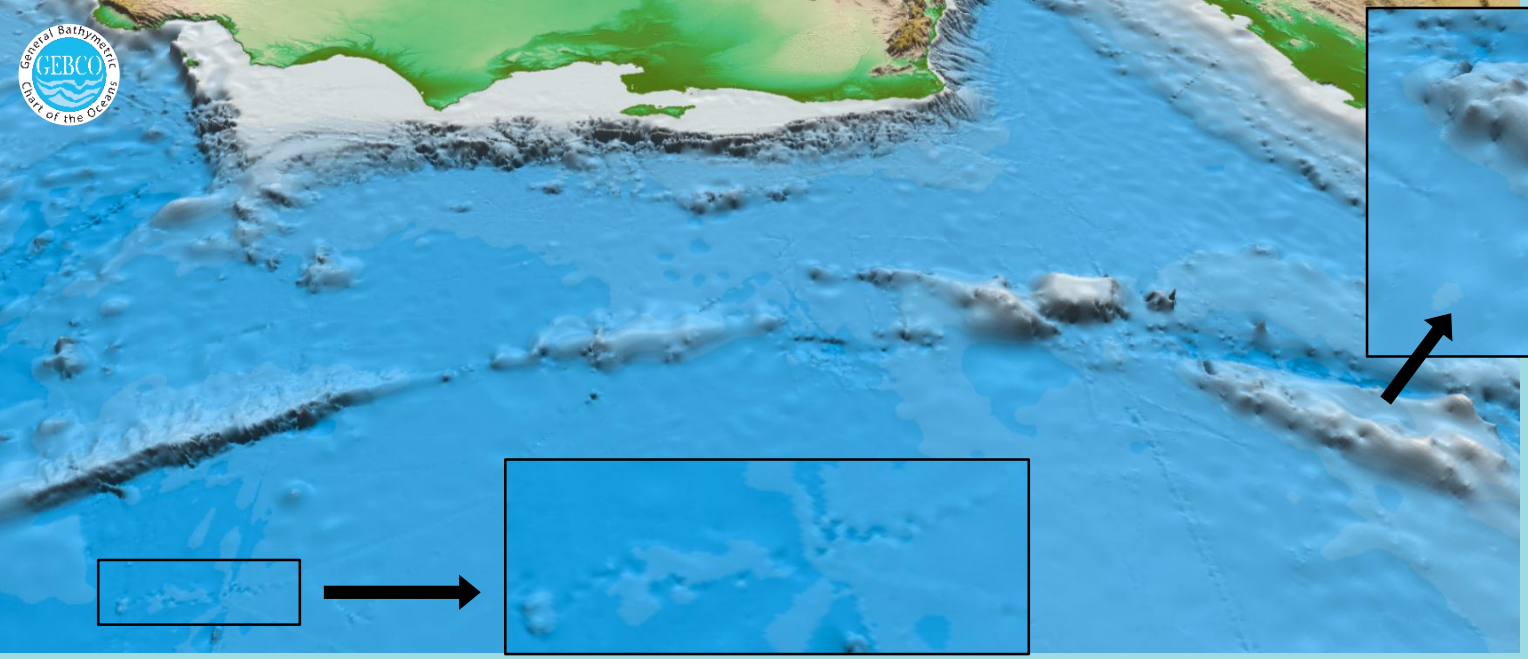
>85 MBES surveys and gridded compilations & > 550 SBES surveys



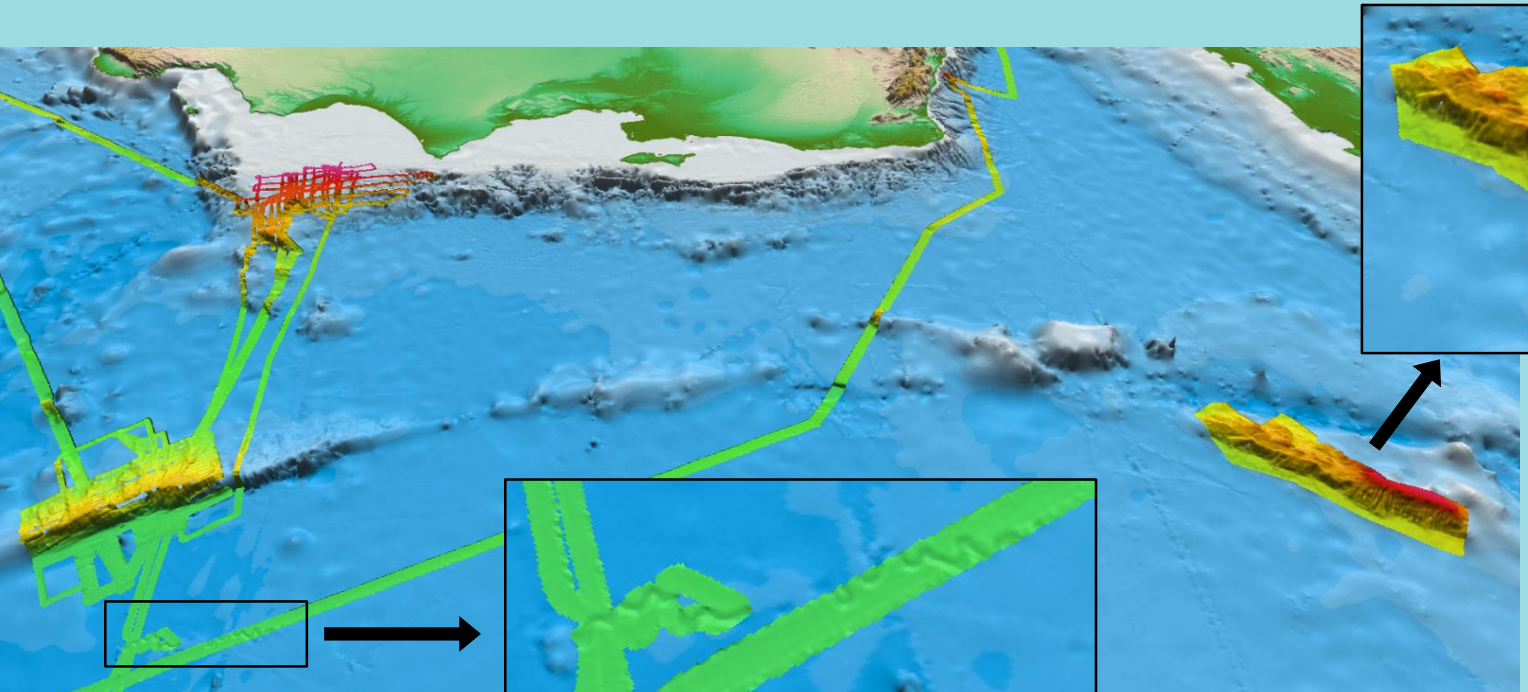
MBES/high-resolution data coverage is very poor



General Bathymetric Chart of the Oceans
GEBCO
United Nations Educational, Scientific and Cultural Organization
UNESCO
Intergovernmental Oceanographic Commission



IOBC MBES data (500 m grid) superimposed on GEBCO_2014 Grid



Summary

GEBCO aims to:

- Continually update and improve its global bathymetric model and collaborate with regional mapping groups to help achieve this

- Encourage (where possible) the contribution of bathymetry data to publicly-available national or international databases

How to contribute data to help update GEBCO's global grid**:**
www.gebco.net/about_us/contributing_data/

Thank you

Any questions?