

GENERAL BATHYMETRIC CHART OF THE OCEANS (GEBCO)

an IHO-IOC Joint Project

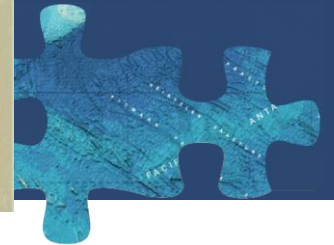
8th ROPME Sea Area Hydrographic Commission (RSAHC) Meeting, Islamabad, Pakistan
18-20 February 2019

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

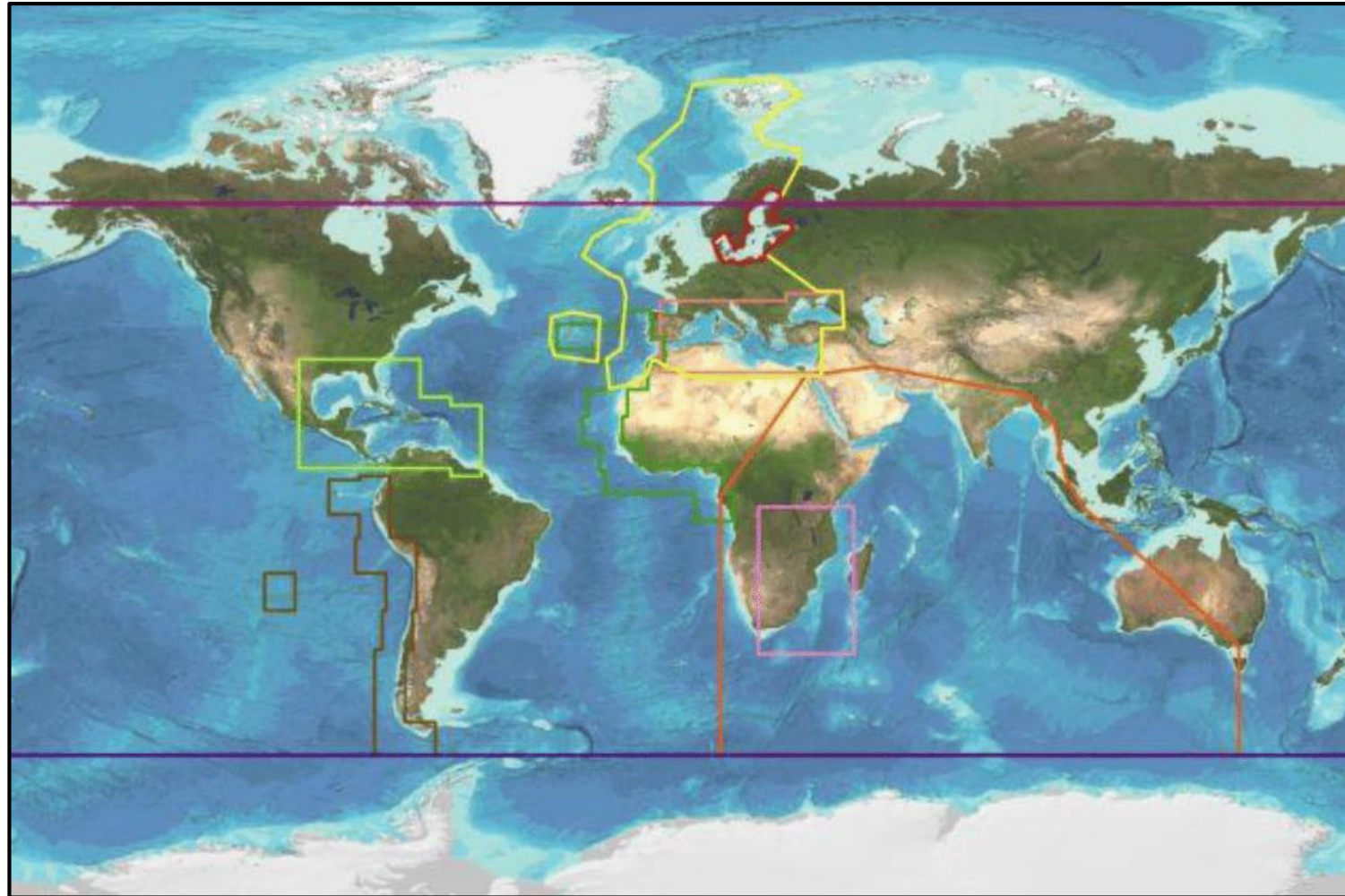
GEBCO Project organisational structure



- 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 4 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)
 - Sub-Committee on Communications, Outreach and Public Engagement (SCOPE)
 - IHO-IOC GEBCO Cook Book

www.gebco.net/about_us/committees_and_groups/

Regional mapping projects



GEBCO products

Our bathymetric data sets and products:

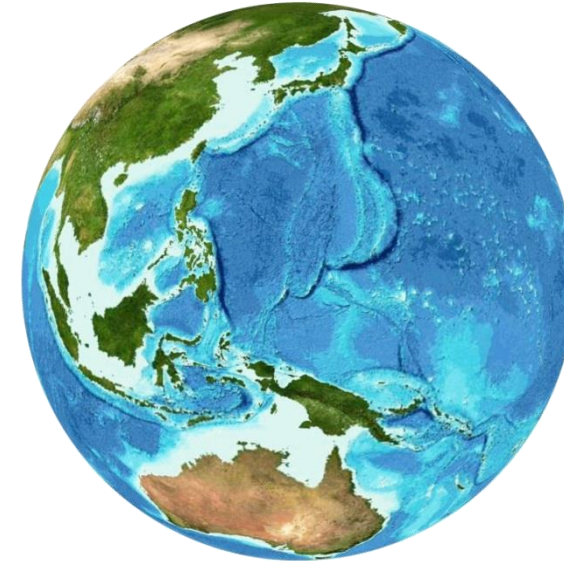
- Global gridded bathymetric data set (30 arc-second interval)
- GEBCO Gazetteer of Undersea Feature Names
- GEBCO Digital Atlas
- Grid viewing software
- Printable maps
- Web Map Service (WMS)
- IHO-IOC GEBCO Cook Book

www.gebco.net/data_and_products/

GEBCO 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



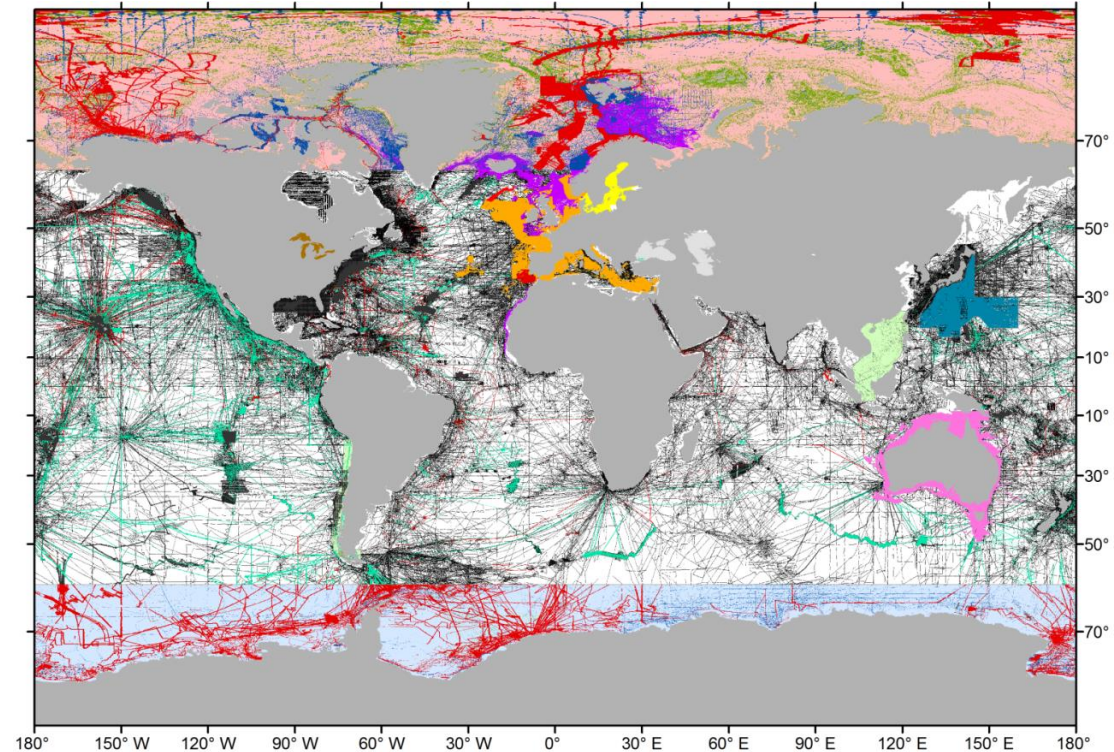
GEBCO's grids are made available for non-navigational purposes:

www.gebco.net/data_and_products/gridded_bathymetry_data/

GEBCO 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 track-line data; pre-existing grids or if it is based on interpolation



- | | | |
|--------------------------------|--|--|
| Region taken from IBCAO V3 | LDEO Global Multi-Resolution Topography Synthesis | Trackline control information from the SRTM30_plus (v5) base grid |
| Region taken from IBCSO V1 | Multibeam bathymetry | Region based on interpolation guided by satellite-derived gravity data within the SRTM30_plus (v5) base grid |
| EMODNet 2013 | Single beam bathymetry | Coastal area updated with shallow water soundings |
| Baltic Sea Bathymetry Database | Bathymetric contours from charts | |
| Geoscience Australia Grid 2009 | North American Great Lakes bathymetry | |
| JHOD grid | Regions based on pre-prepared grids, (first included in the GEBCO_08 Grid) | |
| Olex AS data | | |

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)
- Crowdsourced 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

Seabed 2030



Seabed 2030 is a global initiative to cooperatively work towards creating a high resolution complete map of the world's ocean floor by 2030.



United Nations
Educational, Scientific and
Cultural Organization



Intergovernmental
Oceanographic
Commission

-The **Nippon Foundation** is a private Japanese-based, non-profit grant-making organization with a mission based around philanthropic activities to pursue global maritime development and assistance for humanitarian work.

-The **General Bathymetric Chart of the Oceans (GEBCO)** organization operates under the joint auspices of the International Hydrographic Organization (IHO) and the Intergovernmental Oceanographic Commission (IOC) of UNESCO



Empower the world to *make policy decisions, use the ocean sustainably*, and *undertake scientific research* that is informed by a detailed understanding of the global ocean floor.

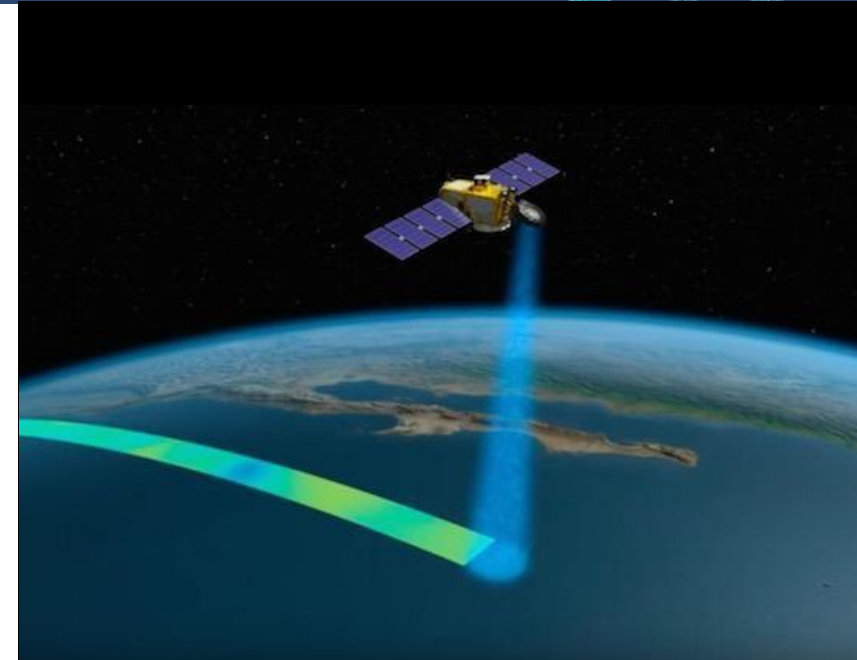
*Only a small portion of the ocean has been mapped with direct measurement.
~ 50% of the world's coastal waters remain unsurveyed*

As of GEBCO 2019 - only 6% of our global goal is met

What can depth information be used for?



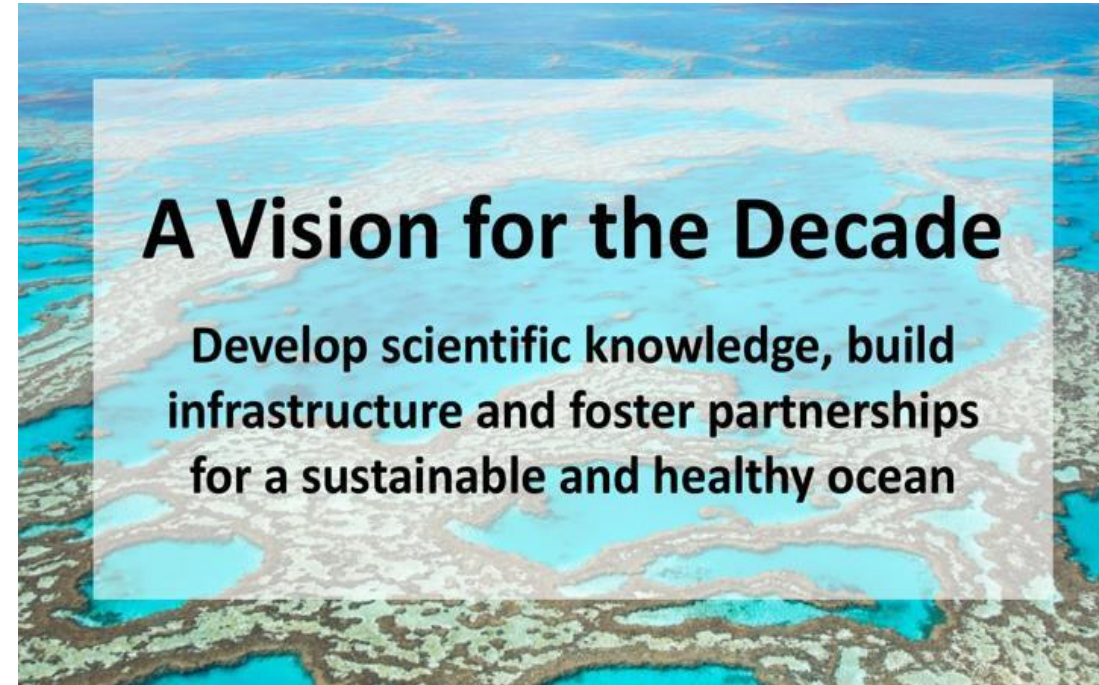
- Nautical charts
- Oil and gas exploration
- Safety and storm surge/tsunami inundation models
- Ecosystem identification and management
- Emergency response
- Satellite verification models
- Coastal and Marine Spatial Planning
- Coastal Hazard Assessment
- Ocean Exploration
- Coastal Change Analysis
- Sea Level Rise Mitigation
- New Energy Siting
- Marine heritage



The UN Decade of Ocean Science for Sustainable Development (2021-2030)



CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT



A Vision for the Decade

Develop scientific knowledge, build infrastructure and foster partnerships for a sustainable and healthy ocean



Seabed 2030 Regional Data Assembly



Seabed 2030: Regional Centers

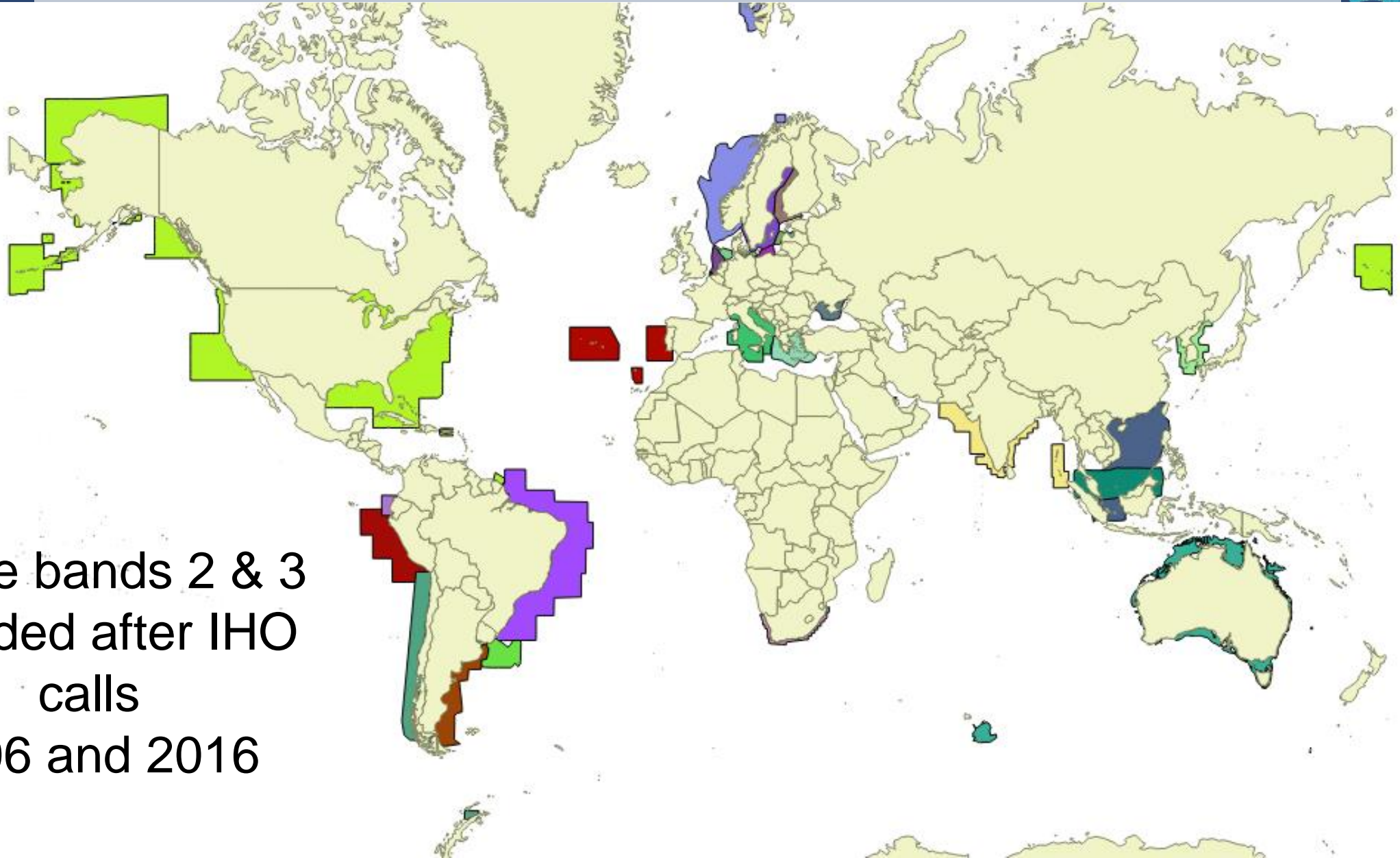


- Coordinate with stakeholders
- Build upon ongoing regional efforts including IBCs
- Develop mechanisms for attribution
- Assemble regional data products

North Pacific-Arctic Ocean
Atlantic-Indian Ocean

South and West Pacific Ocean
Southern Ocean

ENC Data Contributions to GEBCO



Usage bands 2 & 3
provided after IHO
calls
2006 and 2016

Coordinating with IBCs



- Seabed 2030 Atlantic/Indian Oceans RDACC
 - IBC of the Caribbean Sea & Gulf of Mexico (IBCCA)
 - IBC of the Central Eastern Atlantic (IBCEA)
 - IBC of the Mediterranean (IBCM)
 - IBC of the Western Indian Ocean (IBCWIO)
- Seabed 2030 South & West Pacific RDACC
 - IBC of the South Eastern Pacific (IBCSEP)
- Seabed 2030 Arctic/North Pacific RDACC
 - IBC of the Arctic Ocean (IBCAO)
 - IBC of the Caribbean Sea & Gulf of Mexico (IBCCA)
- Seabed 2030 Southern Ocean RDACC
 - IBC of the Southern Ocean (IBCSO)



Seabed 2030 Status & Next Steps



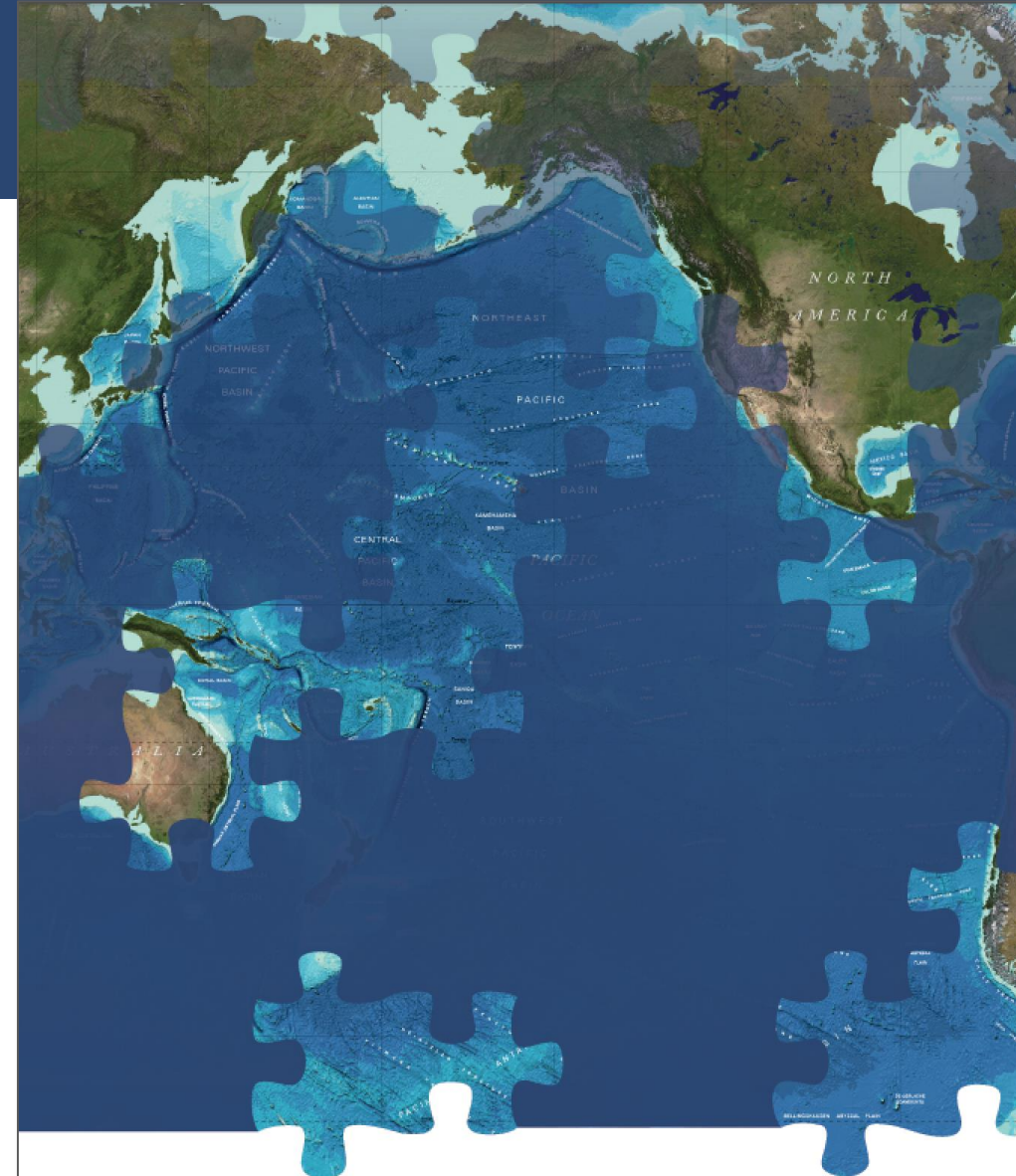
- ✓ Data centers established 2018
- ✓ Initial regional data products generated and passed to Global Center
- New GEBCO grid to be released at spring of 2019
- Establishing connections with regional stakeholders



How to participate

- Contribute information about existing data coverage
- Contribute data
 - Gridded data products
 - Points from ENCs
- Share information about future mapping plans
- Participate in 2019 Regional Mapping Meetings & GEBCO Meetings

atlantic-indian@seabed2030.org



The Nippon Foundation – GEBCO – Seabed 2030
Roadmap for Future Ocean Floor Mapping



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:



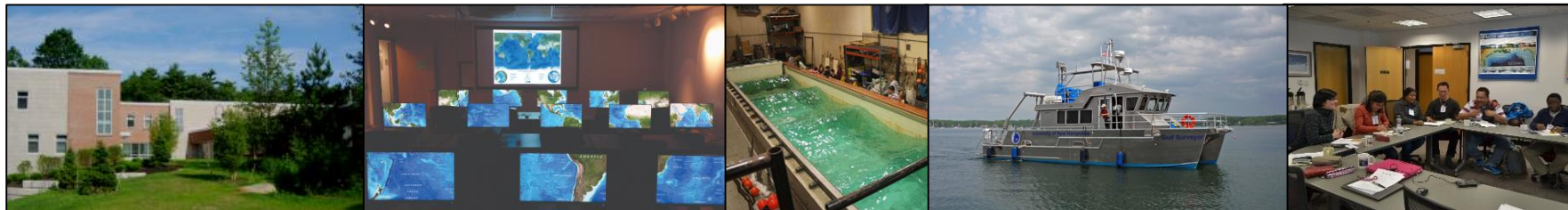
The Nippon Foundation of Japan

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

and taught at:

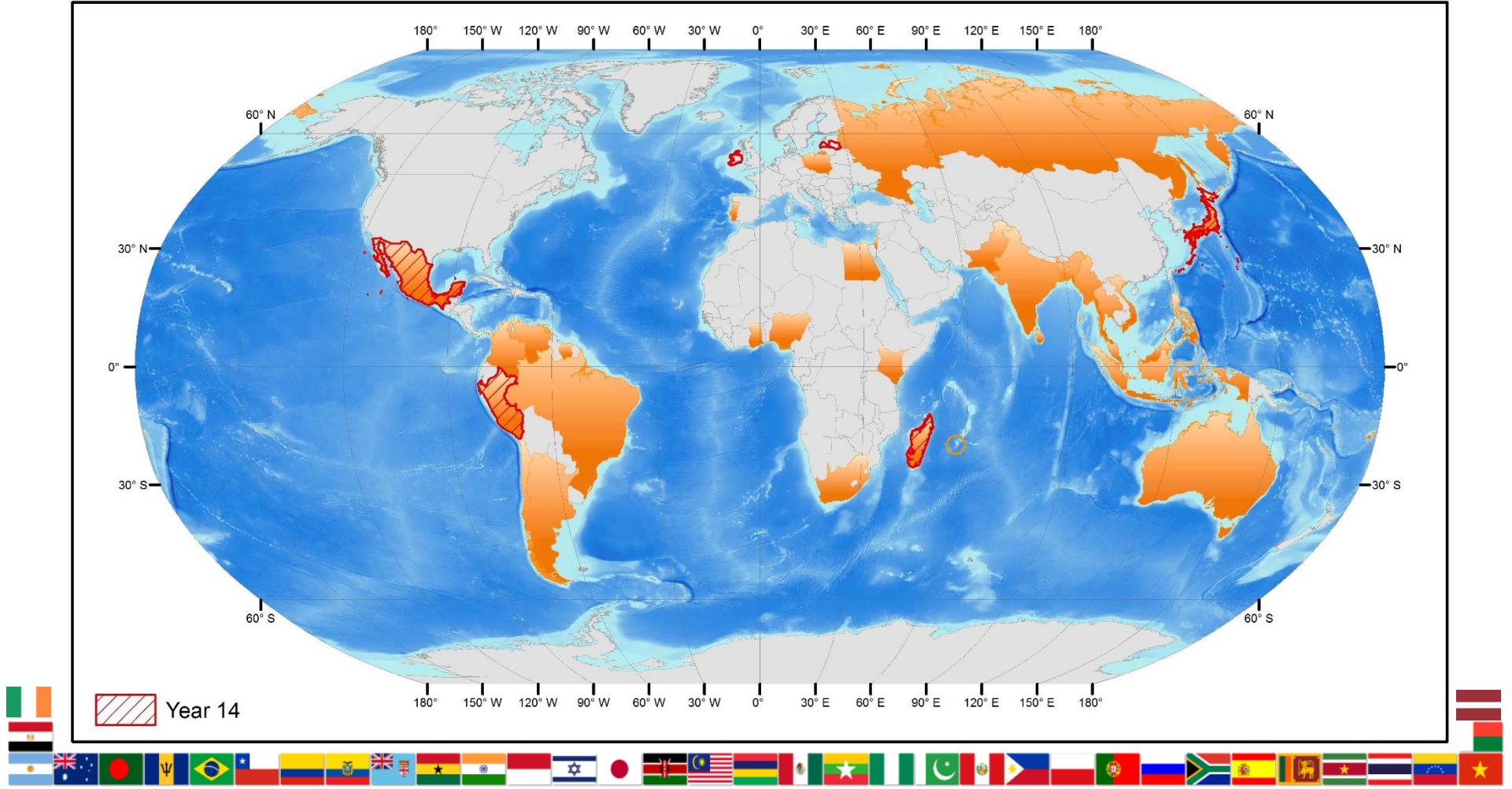
**The Center for Coastal and Ocean Mapping /
Joint Hydrographic Center; University of New Hampshire, USA**

SEE CIRCULAR LETTER 12/2019 - 11 February 2019





84 scholars from 37 coastal states over last 14 years



Postgraduate Certificate in Ocean Bathymetry Training Programme content



Fall Semester
(August-December)

- Fundamentals of Ocean Mapping I
- Applied Tools in Ocean Mapping
- Math for Mapping etc

J-term

- Visit NGDC in Boulder, Co.
- Physical Oceanography for Hydrographers
- Software training (QinSy/CARIS/Hypack)

Spring Semester
(January-May)

- Fundamentals of Ocean Mapping II
- Bathymetric Spatial Analysis
- Geodesy & Positioning for Ocean Mapping
- Seamanship and Marine Weather
- Physical Oceanography for Hydrographers

Summer
(June-August)

- Students will take the Hydrographic Field Course

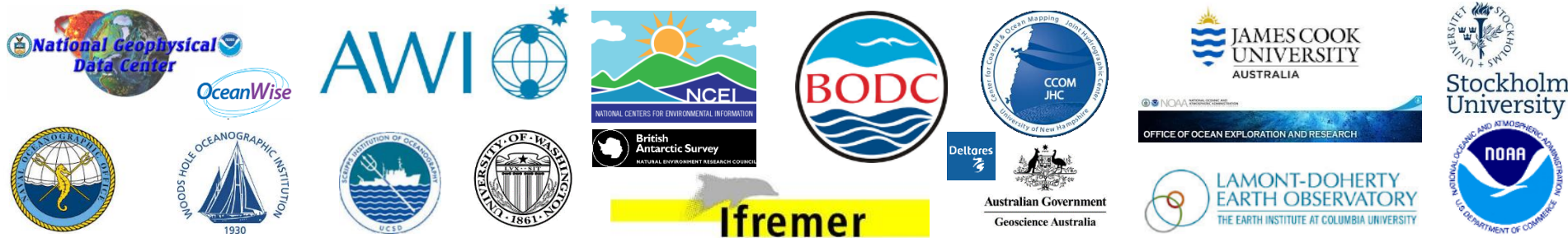
Lab Visit & Cruise

- The working visit to a research organization and / or a cruise is selected by student and their home organization in a field of mutual interest.

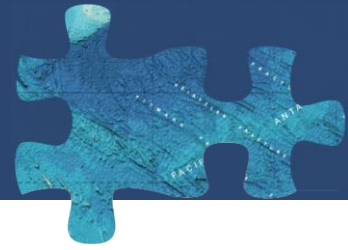
Nippon Foundation / UNH Training programme



- Students **MUST** also undertake a working visit to another research organization and a research cruise over the summer (selected by student and home organization in field of interest)
- The lab is included to round out the students training, to help them build their new make new contacts 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.
- **BUILDS ALUMNI NETWORK**



Qualifications attainable



- *Postgraduate certificate in Ocean Bathymetry*
- *UNH Graduate Certificate in Ocean Mapping*
- *FIG/IHO/ICA Category A hydrography (theory)*
- **Networks they develop are most significant**
 - amongst GEBCO scholars and CCOM graduate students as well as other alumni of the training programme
 - through interactions with academic, scientific and business leaders at CCOM through lab visits, internships, cruises and other GEBCO meetings and projects





Thank you!

David Wyatt

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IHO Secretariat

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<https://seabed2030.gebco.net>