



Nippon Foundation / GEBCO projects : current status and looking into the future

Seeboruth Sattiabaruth
GEBCO-NF Scholar Year 2016-2017

Surveyor, Mauritius Hydrographic Service
Ministry of Housing and Lands
Mauritius

hydrounit@govmu.org

What is GEBCO?



The General Bathymetric Chart of the Oceans

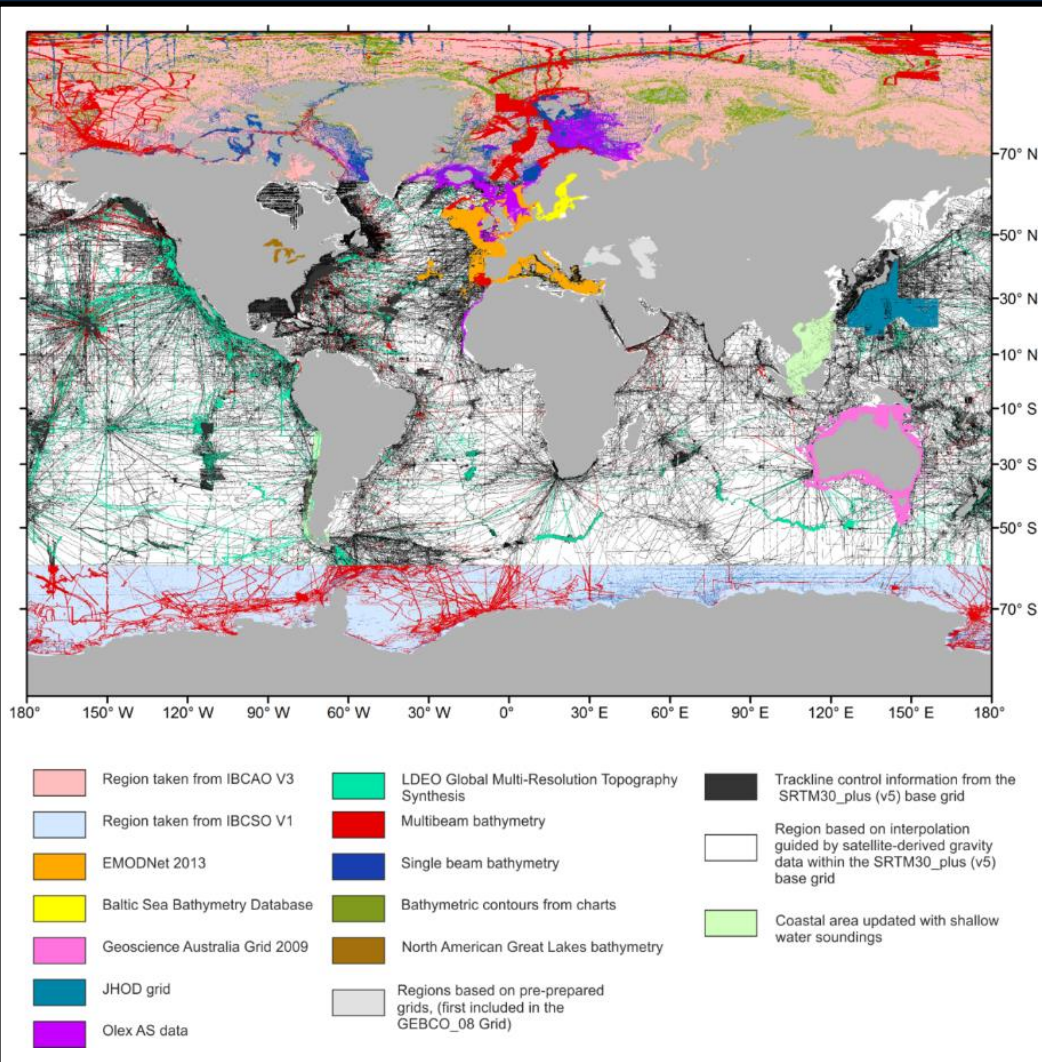
International group of experts who aim to provide the most authoritative, publicly-available bathymetric datasets for the world's oceans

GEBCO operates under the joint auspices of the International Hydrographic Organization and Intergovernmental Oceanographic Commission of UNESCO

www.gebco.net

GEBCO_2014 products:

www.gebco.net/data_and_products/



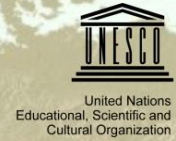
- SID showing the source of depth value in each grid cell:
 - Node based on trackline data
 - Pre-existing grids or
 - Based on interpolation

- IHO-IOC GEBCO Cook Book

https://www.gebco.net/data_and_products/gebco_cook_book/

- GEBCO Sub-Committee on Undersea Feature Names (SCUFN) digital gazetteer of the standardized names, is available via a webmap application

<http://www.ngdc.noaa.gov/gazetteer>



New and existing GEBCO projects:

- Nippon Foundation / GEBCO Seabed 2030
- Nippon Foundation / GEBCO training program
- GEBCO-NF Alumni Team for the Shell Ocean Discovery XPRIZE Challenge

The Nippon Foundation

Charitable organization since 1962 – whose goal is to help build a society where people support one another



Guiding Principles:

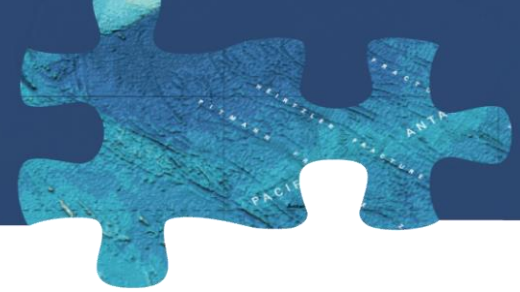
- * Discover
- * Prioritize
- * Be creative
- * Do it now
- * Be open
- * Grow
- * Expand networks

“THE FUTURE OF OUR OCEAN”

- *1 of 4 main international activity focuses*
- *10 funded programs under this banner*

Nippon Foundation - GEBCO

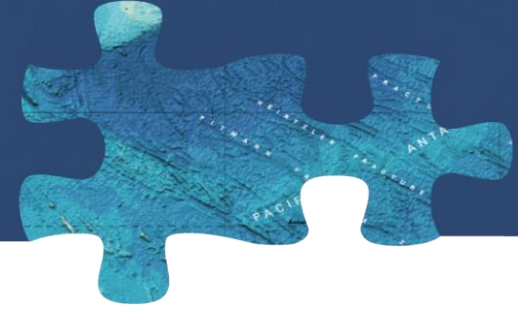
Seabed 2030: Mission



- Aims to bring together all available bathymetric data to produce the definitive map of the world ocean floor by 2030 and make it available to all.
- Builds on more than 100 years of GEBCO's history in global seafloor mapping.
- Focus for data compilation and co-ordination activities for Seabed 2030 is carried out at four Regional Centers.

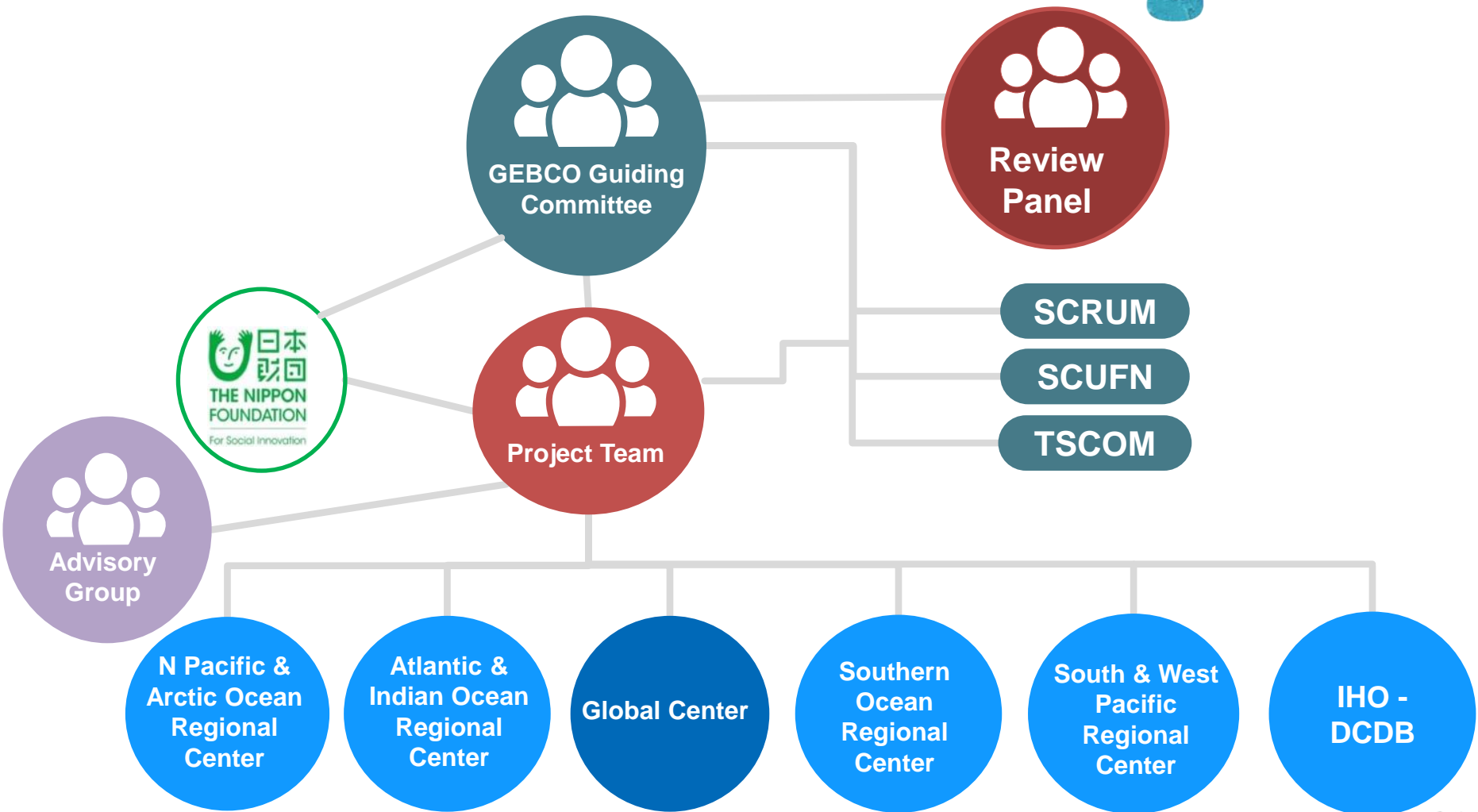
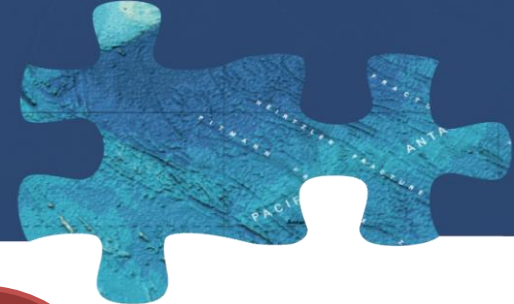
<https://seabed2030.gebco.net>

Four Pillars of Seabed 2030

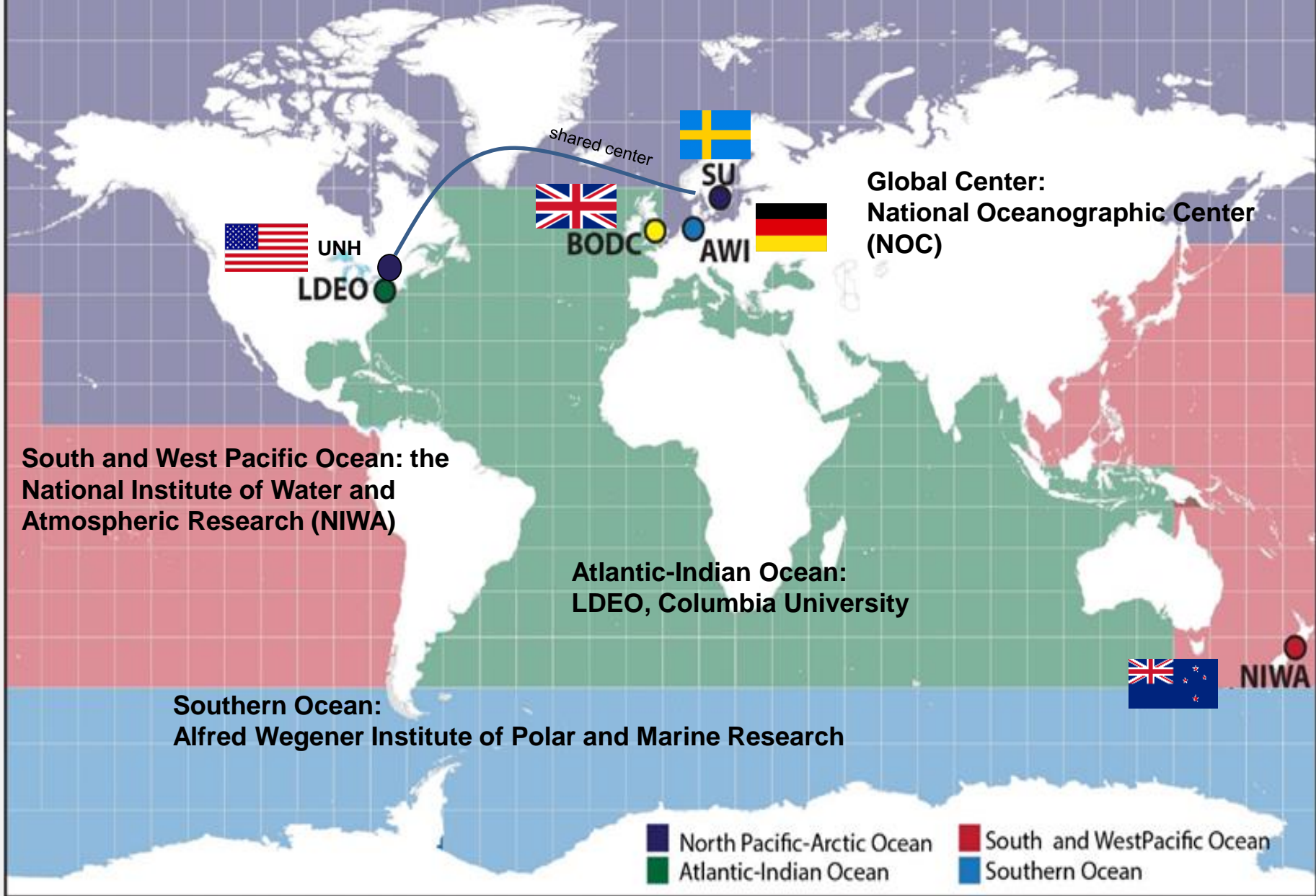


- **Data Assembly and Coordination**
 - Integrate and process existing data & identify data gaps to inform future mapping missions
 - Promote data sharing by encouraging contribution of data to the IHO DCDB
 - Create new GEBCO data products
- **Global Community Engagement**
 - Identify & engage the GEBCO community as well as other stakeholders through community events, traditional & digital media
- **Consolidate Technical and Human Capacity**
 - Explore and leverage new technology
 - Engage Nippon Foundation / GEBCO Training Project Alumni
- **Cross-cutting area of Corporate Governance**
 - Strong stakeholder communication
 - Legal and accounting standards

Seabed 2030 Structure



**North Pacific-Arctic Ocean:
Stockholm University/University of New Hampshire**



UNH

LDEO



BODC



SU



AWI

**Global Center:
National Oceanographic Center
(NOC)**

**South and West Pacific Ocean: the
National Institute of Water and
Atmospheric Research (NIWA)**

**Atlantic-Indian Ocean:
LDEO, Columbia University**

**Southern Ocean:
Alfred Wegener Institute of Polar and Marine Research**



NIWA

North Pacific-Arctic Ocean
Atlantic-Indian Ocean

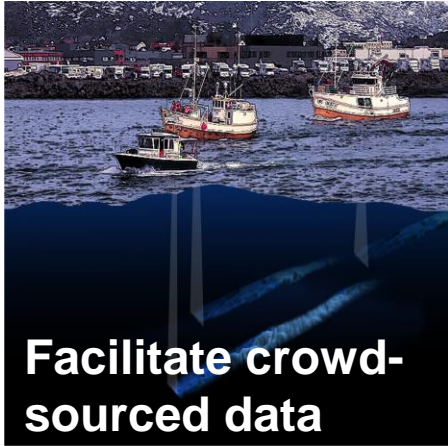
South and West Pacific Ocean
Southern Ocean

What will the centers do?

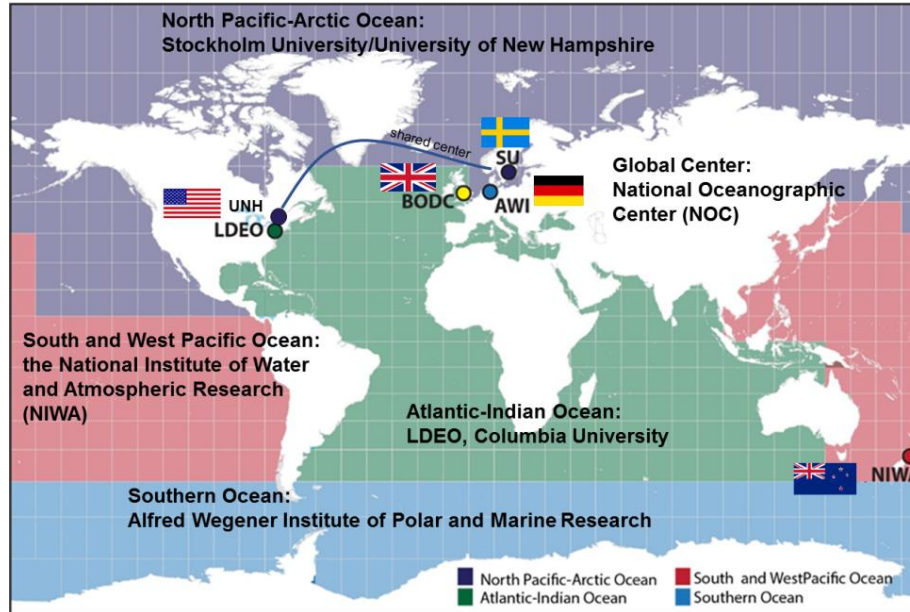
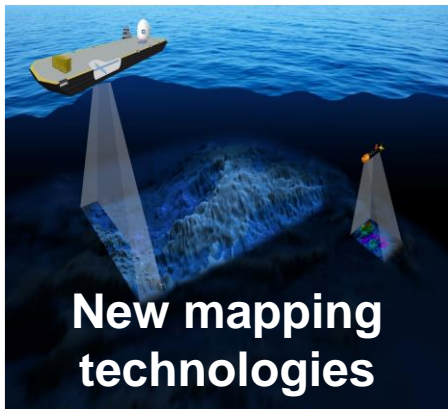
Coordinate and inspire mapping expeditions



Facilitate crowd-sourced data



New mapping technologies

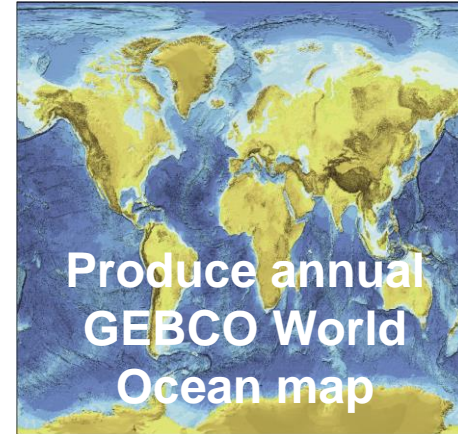


Work with.....

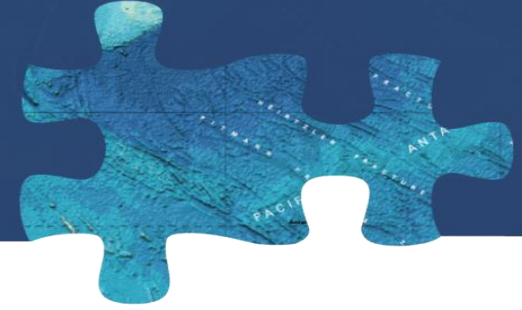
- Academia
- Industry
- Governments



- Responsible for compiling bathymetric information
- Co-operate and work closely with existing regional mapping initiatives
- Develop bathymetric data processing and assembly tools



Seabed 2030 Culture



➤ Co-operation and Community Building

➤ Coordination

- Initial Seabed 2030 focus on >200 m water depth
- Hydrographic Offices concentrate on < 200 m water depth

➤ Crowdsourcing

- Fishing boats, cargo, passenger and cruise ships, private yachts...

➤ Credit and Attribution

- Recognize data contributions, in-kind services, promotion, capacity building...

Capacity-building initiative: Ocean Mapping Training Program



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**





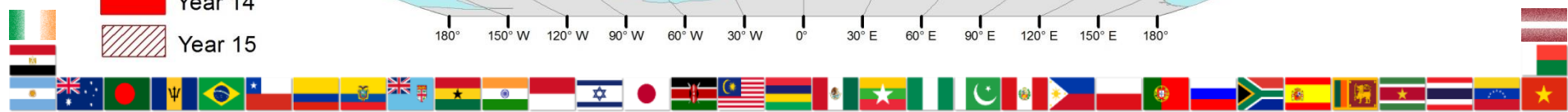
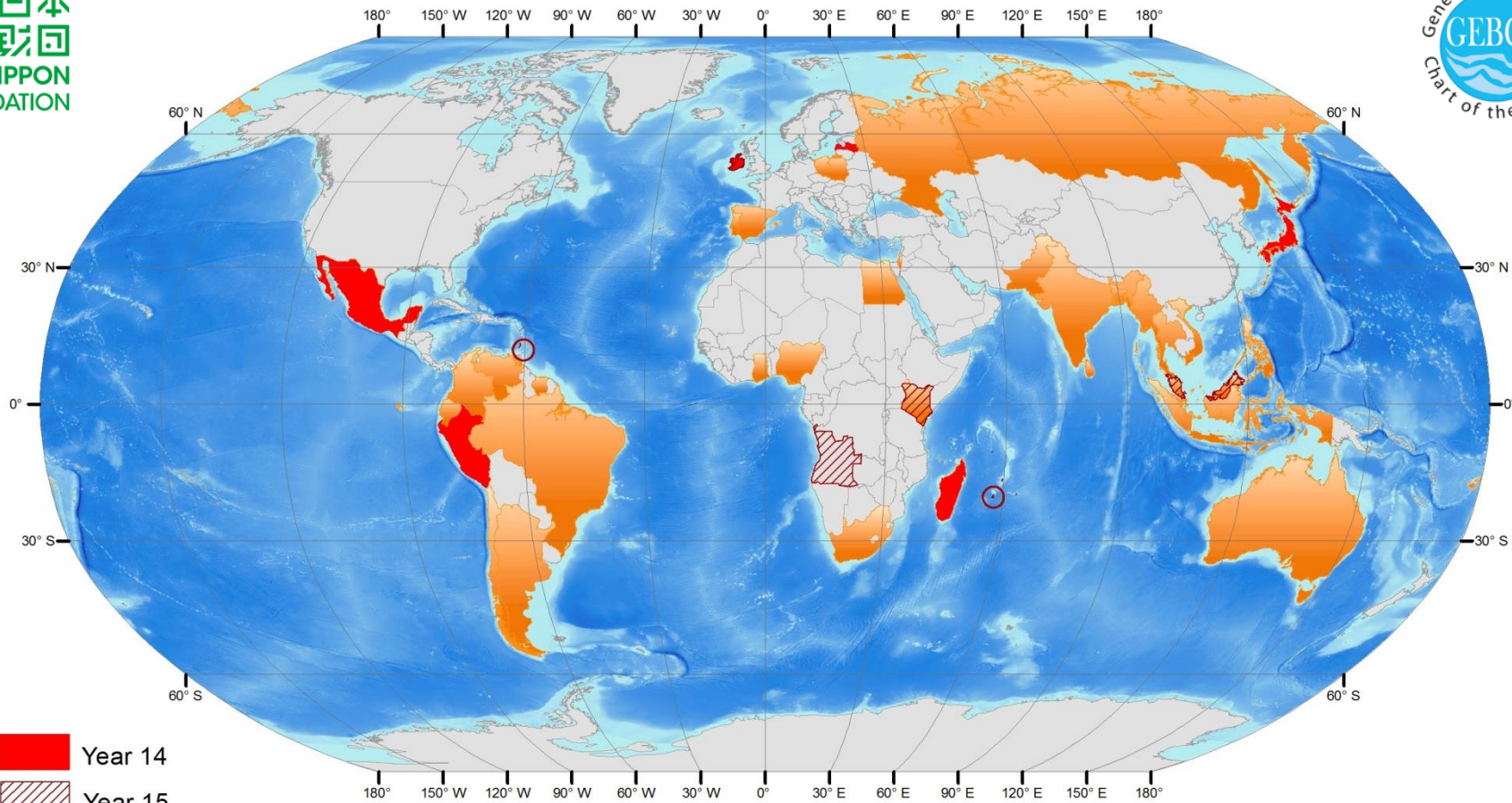
The aim of this program is to build a **global network of young ocean mappers**, who can use the skills, knowledge and network of contacts they acquired during their training to build capacity within their own country and to keep the Nippon Foundation / GEBCO community growing.

This will ensure that a new generation of ocean mappers will continue to build on our knowledge of the world's oceans.

Capacity-building initiative: Nippon Foundation / GEBCO Alumni



84 scholars from 37 coastal states over last 14 years with the current class coloured red
Add incoming Year 15 class (hatch) – up to 90 people from 38 coastal states



Postgraduate Certificate in Ocean Bathymetry Training Program content

Fall Semester
(August-December)

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

J-term

- Visit NCEI 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
- Geological Oceanography for Hydrographers

Summer
(June-August)

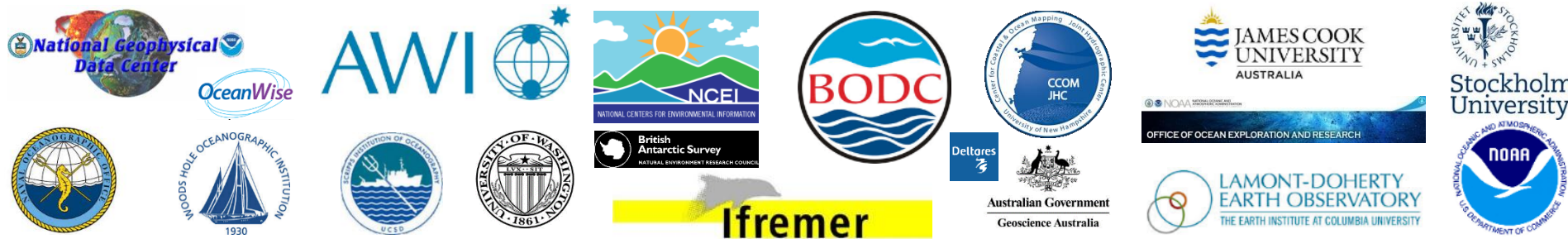
- Software training (QinSy/CARIS/Hypack)
- Hydrographic Field Course

Lab Visit & Cruise

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

Nippon Foundation / GEBCO Training program

- 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

- *GEBCO Postgraduate certificate in Ocean Bathymetry*
- *UNH Graduate Certificate in Ocean Mapping*
- *FIG/IHO/ICA Category A hydrography (theory)*

Networks they develop are most significant

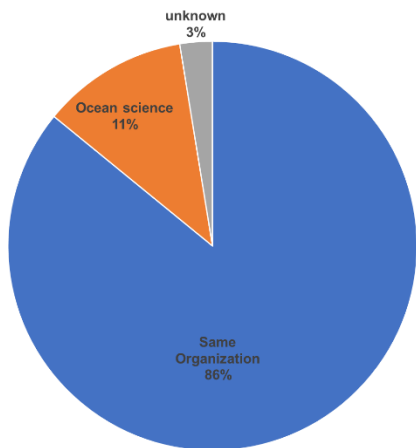
- amongst GEBCO scholars and CCOM graduate students as well as other alumni of the training program
- through interactions with academic, scientific and business leaders at CCOM
- through lab visits, internships, cruises and other GEBCO meetings and projects



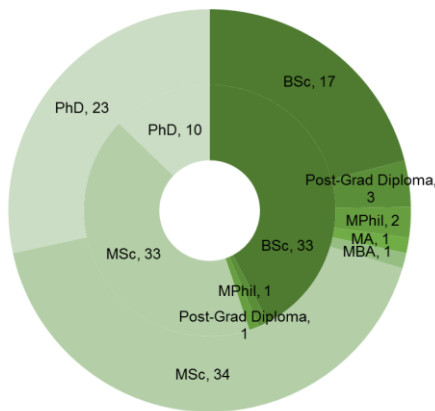
Measure of our success



ORGANIZATIONAL CONTINUITY

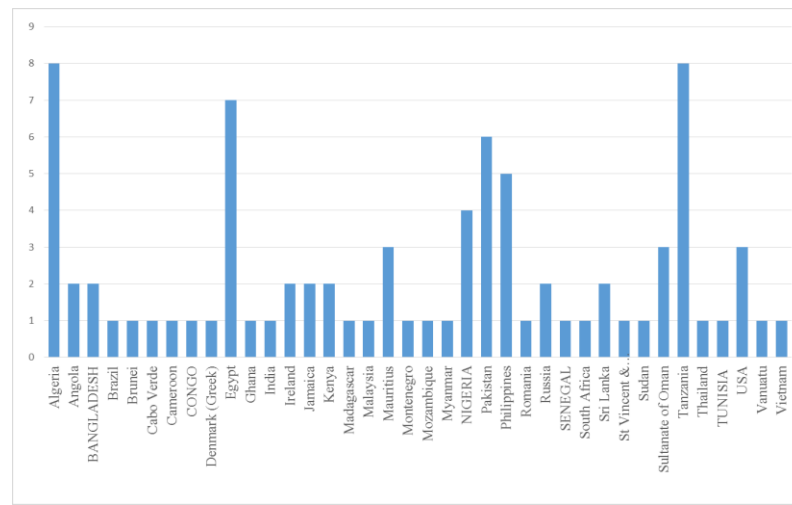


CONTINUED EDUCATION



Note:
 Inner ring values: Pre-Training Education
 Outer ring values: Post-Training education achieved
 with 12 Master degrees obtained (6 at UNH) and 13 new doctorates

83 applications from 38 countries for 2018/2019

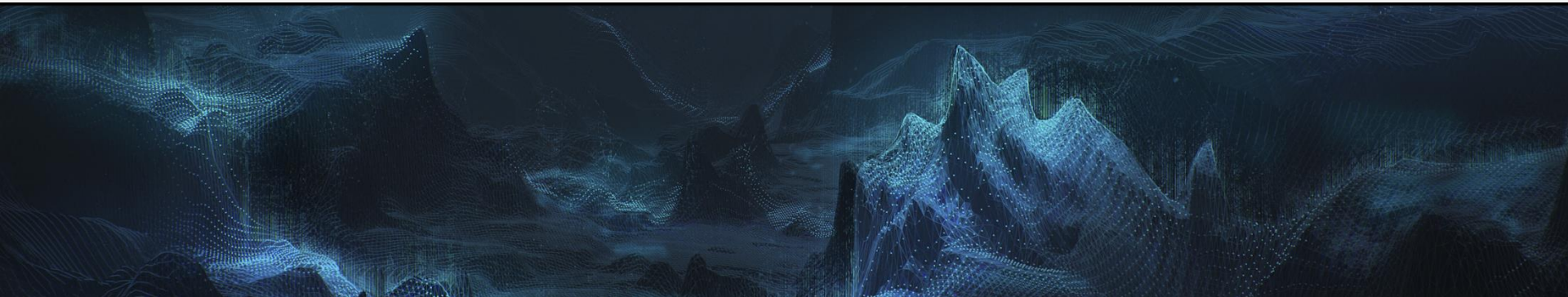




A \$7 million global competition challenging teams to advance deep-sea technologies for autonomous, fast and high-resolution ocean exploration.

Create solutions that advance the autonomy, scale, speed, depths and resolution of ocean exploration

<http://oceandiscovery.xprize.org>



The key elements of the Round 1 / 2 challenge

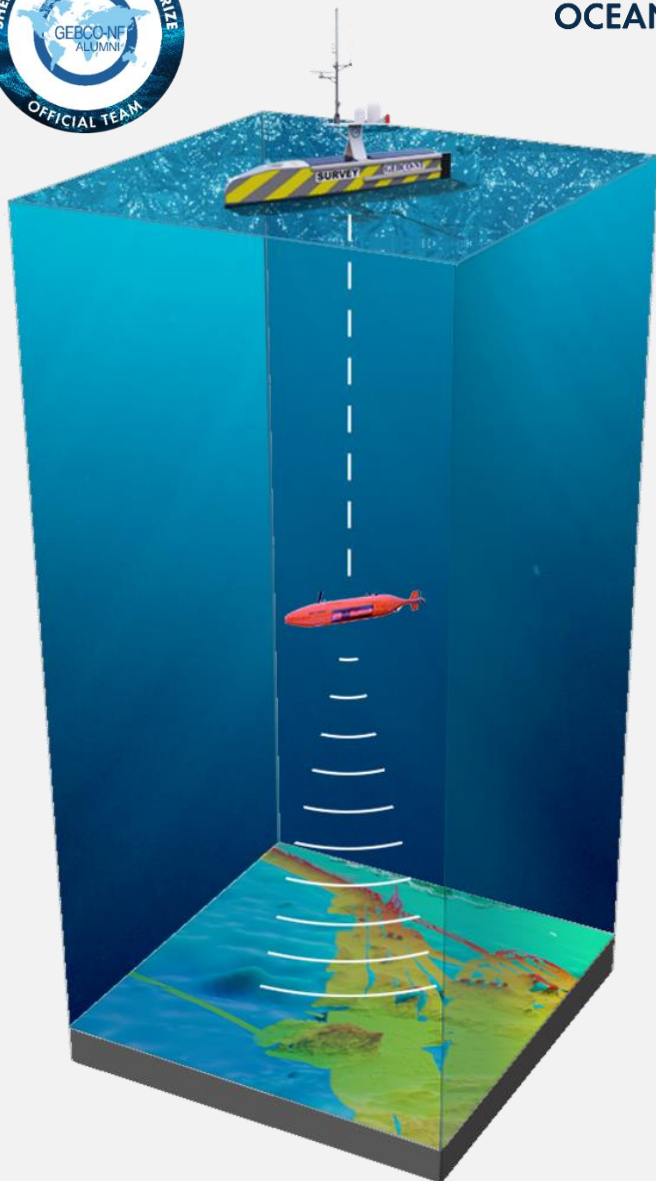
1. Create an autonomous solution to collect data
2. All components used for data gathering must fit within a standard 40 ft shipping container
3. Produce a high-resolution bathymetric map of an area of 100 km² / 250 km²
(5 m horizontal and 0.5 m vertical resolution)
4. Produce images of a specified object
5. Identify and image five / ten archeological, biological or geological features

**Data collection must be completed in 16 / 24 hours
with 48 hours for product generation**



Shell
OCEAN DISCOVERY XPRIZE®

FINALIST



New autonomous surface vessel capable of deployment & retrieval of AUV

- Hushcraft Limited SEA-KIT USV *Maxlimer* with KM HiPAP
- Remote and Autonomous operations facilitated by Kongsberg Maritime K-MATE.

Commercially available Kongsberg Maritime HUGIN AUV

- Round 1: Ocean Floor Geophysics *Chercheur* AUV: 3,000 m
- Round 2: Kongsberg Maritime: 4,500 m

Autonomous and Cloud based data processing for fusion of seafloor bathymetry and imagery

- Fusion of EM2040 MBES, HISAS real aperture bathymetry, HISAS synthetic aperture side-scan imagery, and spot-focused synthetic aperture HISAS imagery and bathymetry.

International team of volunteers, scholars, industry experts, advisors, partners and suppliers.



GEBCO-NF Alumni Team 1 of 9 Teams through to Round 2 of



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OFG Ocean Floor Geophysics



TELEDYNE CARIS



EARTH ANALYTIC

Raitt Orr & Associates Limited
GOVERNMENT & PUBLIC RELATIONS CONSULTANTS

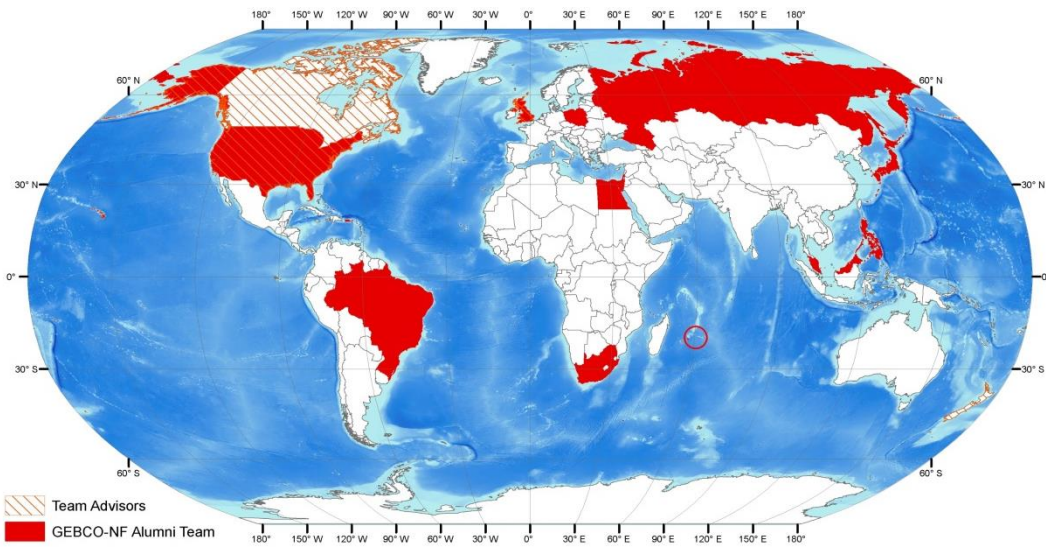


Eclipse Group

esri

OCEANAERO

SAND Geophysics





Shell OCEAN DISCOVERY XPRIZE

LIV MÅLÖNER
MALDON

SEVEN OCEAN



> 50 team members from 14 countries

