

GEBCO & Seabed 2030

GEBCO



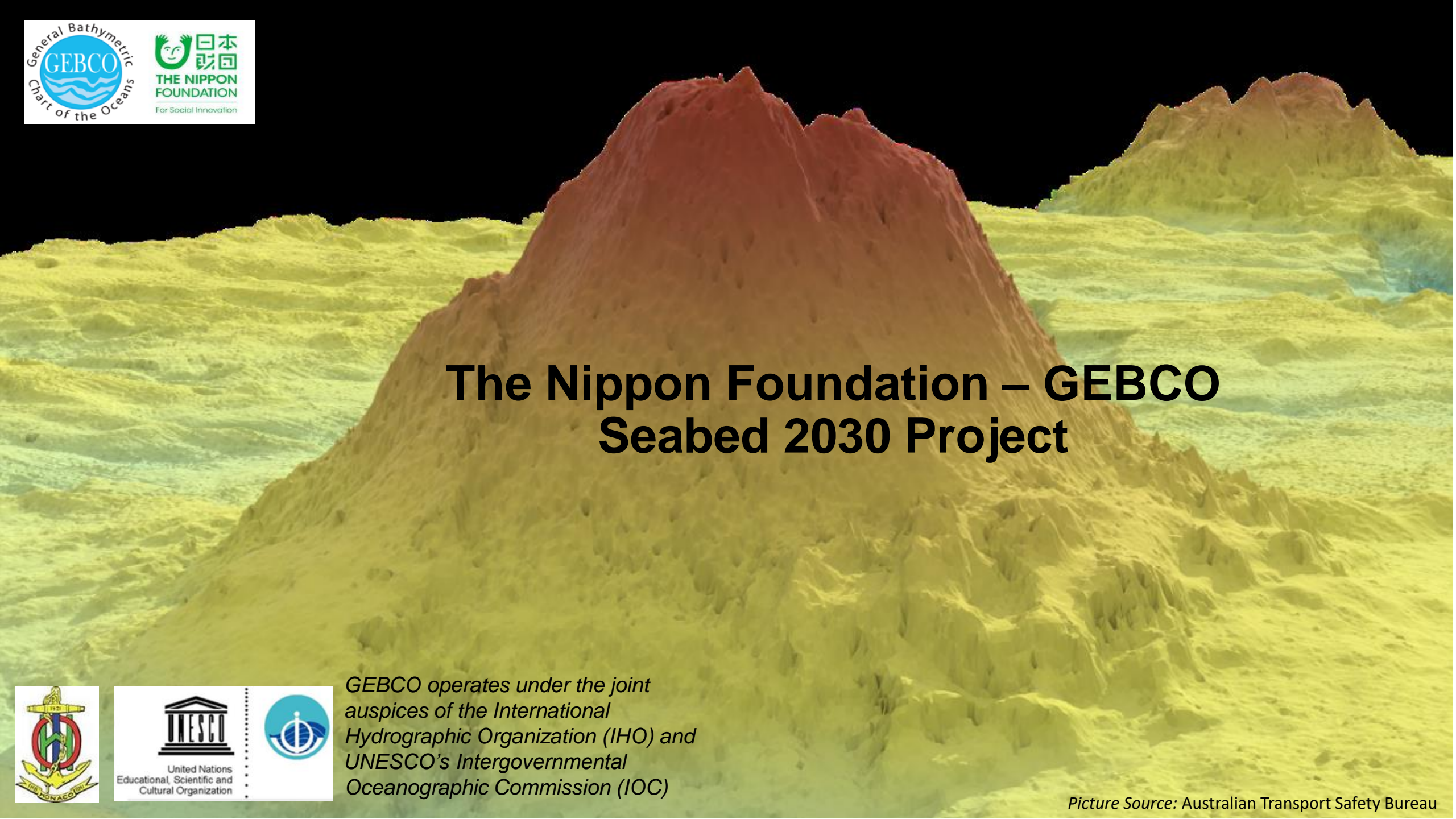
‘ The **General Bathymetric Chart of the Oceans**’

‘... a joint programme of **IHO & IOC**, managed by the GEBCO Guiding Committee (GGC)’

‘...aiming to provide the most authoritative, publicly-available bathymetry data sets of the world’s oceans.’

‘... largely a **voluntary** community of international **scientists, hydrographers and industry reps**, collaborating with the support of their parent organizations.’





The Nippon Foundation – GEBCO Seabed 2030 Project



*GEBCO operates under the joint
auspices of the International
Hydrographic Organization (IHO) and
UNESCO's Intergovernmental
Oceanographic Commission (IOC)*



Sustainable Development Goals



14 LIFE BELOW WATER

Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Source: www.saveoursea.social/oceansdg



TARGET

14-A



INCREASE SCIENTIFIC KNOWLEDGE, RESEARCH AND TECHNOLOGY FOR OCEAN HEALTH

The Science We Need for the Ocean We Want



#OCEANDECADE



2021 United Nations Decade of Ocean Science
2030 for Sustainable Development



GEOBCO



IHO



OCEAN DECADE CHALLENGES



DECADE OUTCOMES

"THE OCEAN WE WANT"

- A clean ocean
- A healthy and resilient ocean
- A productive ocean
- A predicted ocean
- A safe ocean
- An accessible ocean
- An inspiring and engaging ocean

	Pollutants	Coastal -bathymetry
	Ecosystems	Mapping central
	Food from the Ocean	Bathymetry dependent
	Ocean economy	Mapping intensive
	Ocean-climate nexus	Modelling, SLR, etc.
	Ocean-related risks	Bathymetry intensive
	Ocean observing system	Georeferencing
	Ocean digital representation	Central facility
	Capacity development	Strongly needed
	Behaviour change	Resonates with people

Bloomberg 17 August 2021

Technology & Ideas

To Save Earth's Climate, Map the Oceans

Countries must collaborate on a vital effort to finish the job by 2030.

By

[Dawn Wright](#) Professor of Geology and Oceanography University of Oregon, chief scientist Esri

August 17, 2021, 8:00 AM GMT+2 *Corrected August 17, 2021, 6:06 PM GMT+2*



What lies beneath?

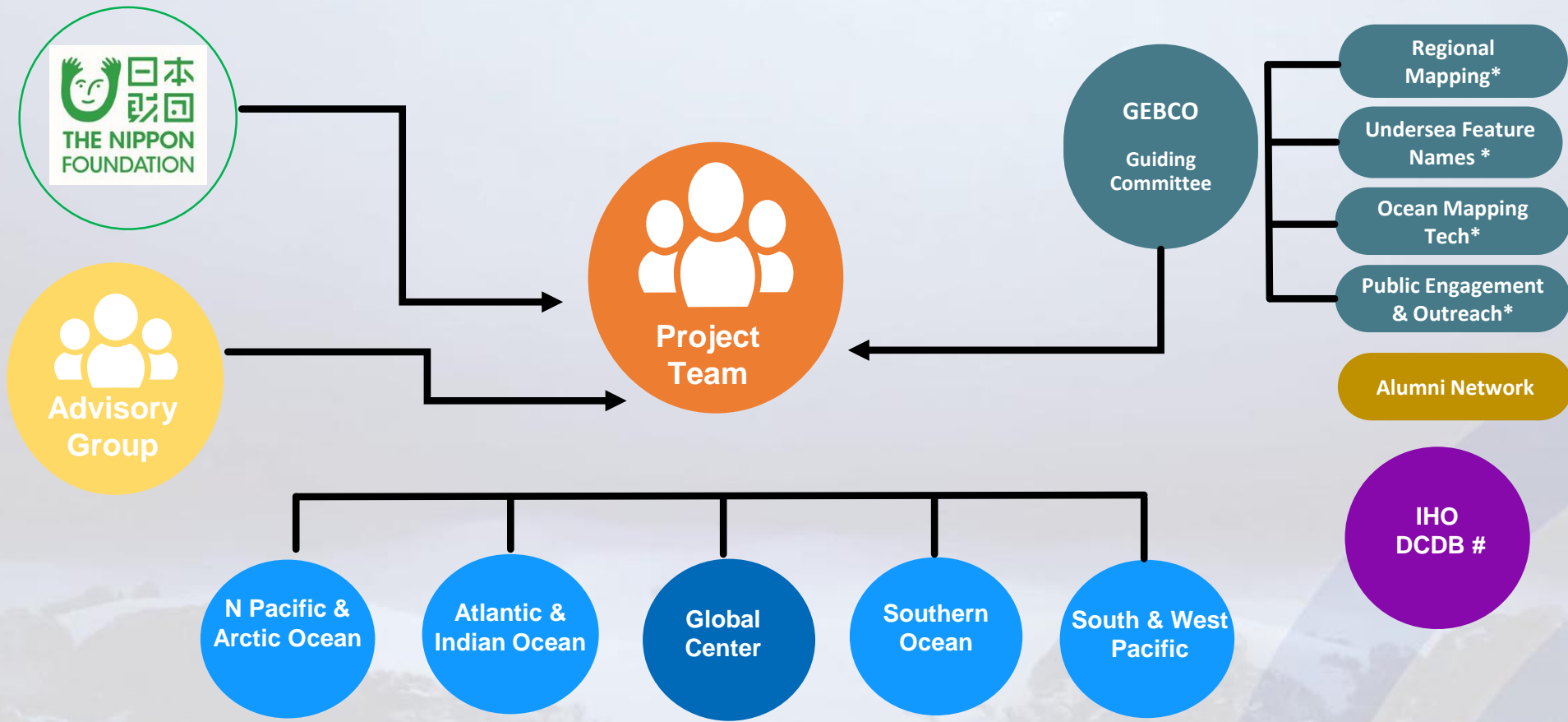
Photographer: David McNew/Getty Images



GEBCO



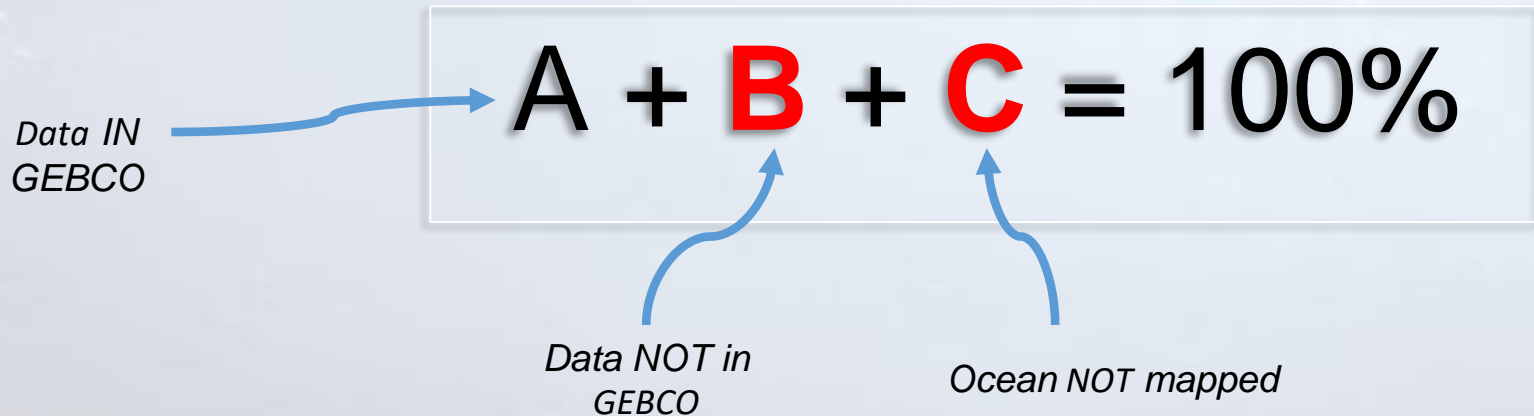
Seabed 2030 Network



4 “Regional Centers” + 1 “Global Center”

(* GEBCO Sub Committees)

(# Data Centre for Digital Bathymetry)



➤ **Ocean Frontier Mapping**

- Use GEBCO Grid to inform location of future mapping
- Advocate for greater mapping activity
- Identify funding for mapping expeditions

➤ **Crowd Sourced Bathymetry**

- Promoting CSB around the world
- Gaining support of, and data from, contributors at all levels
- Palau, South Africa & Greenland field trials

➤ **Technology Innovation**

- What can Seabed 2030 do to accelerate uptake of Technology to accelerate rate of bathymetric mapping?

We need the support of:

➤ **Governments**

- To make available existing data sets within areas of national jurisdiction for Seabed 2030 use

➤ **Industry & Academia & Citizens**

- To work with stakeholders to free up existing data for Seabed 2030 use

➤ **All**

- To gather new data for Seabed 2030 use

GEBCO results measured against present day requirements:

1903-2017: From 0% to 6% minimum acceptable data coverage

2017-2021: From 6% to 21% minimum acceptable data coverage
Out of 15% increased data coverage, 2% new data

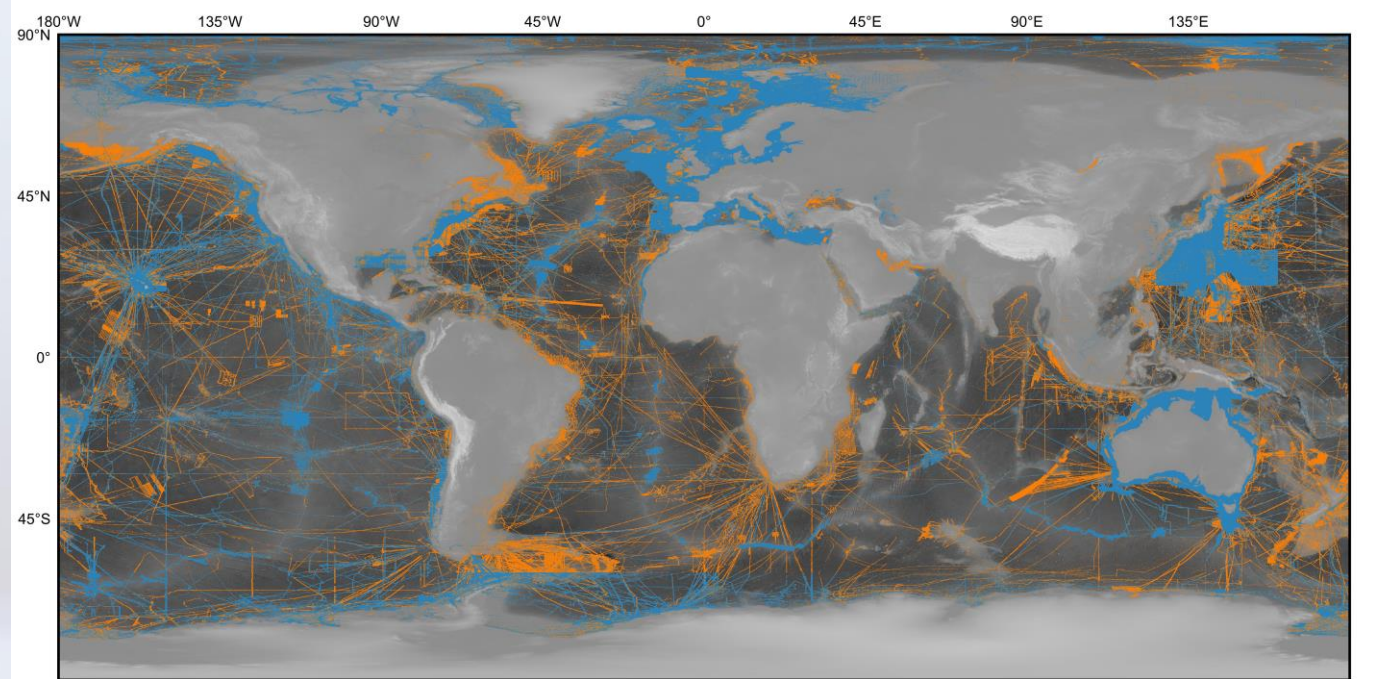
2005: 100% 10m DEM coverage of all landmass

2021: 100% detailed topography coverage of Moon, Venus and Mars

Progress so far...

GEBCO 2021 Grid Delivery

- GEBCO Grid stood at 6% coverage when Seabed 2030 began
- Ocean mapping coverage now stands at **20.6%**



— GEBCO 2014
— Data additions to 2021

Courtesy: Martin Jakobsson, SU

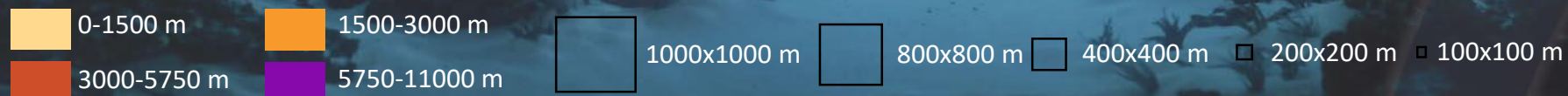
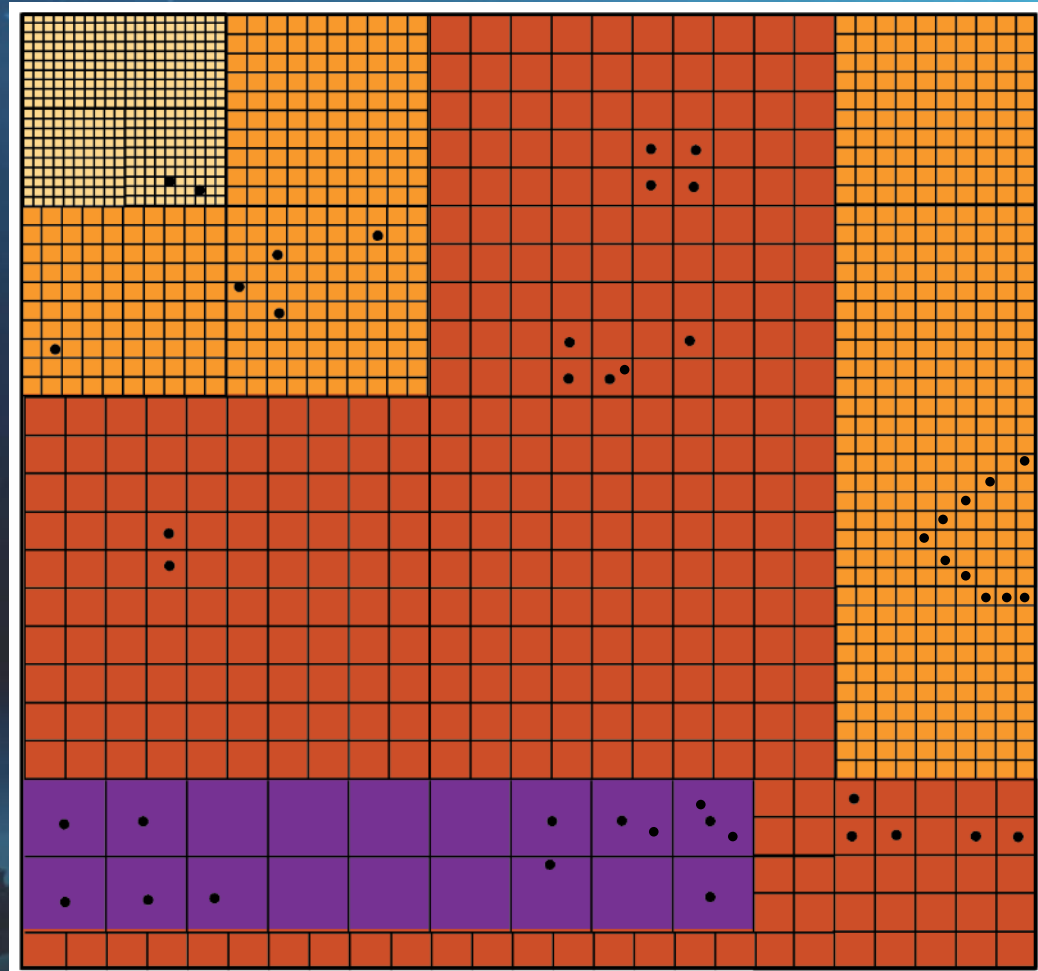


Basic concept:

Grid cell considered mapped if it contains one or more soundings.

Data used to compute values in the GEBCO Ocean Map (aka the GEBCO Grid) but not distributed as part of the end product.

We are pleased to accept decimated data at lower resolutions than that collected if data considered sensitive.



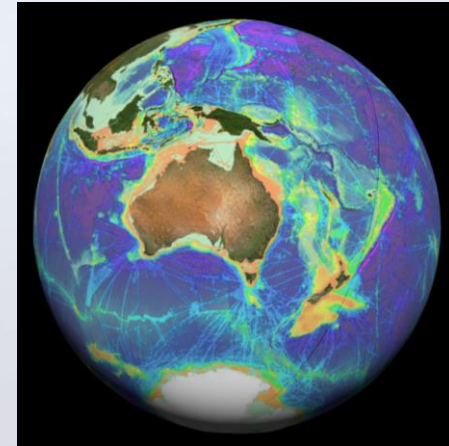
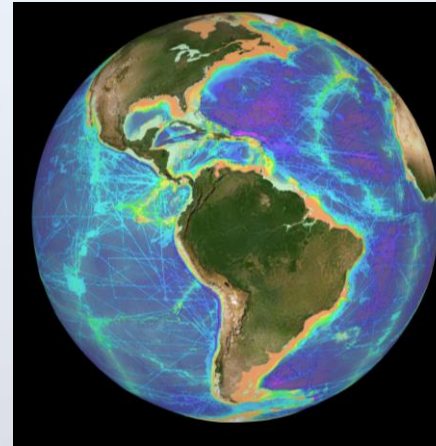
The GEBCO 2021 Grid

- Published June 2021 with **20.6%** coverage
- Still almost 4/5ths of the ocean floor still to be mapped
- Look in more detail either by downloading the Grid from gebcoco.net or via these very new *beta-version* interactive webapps:

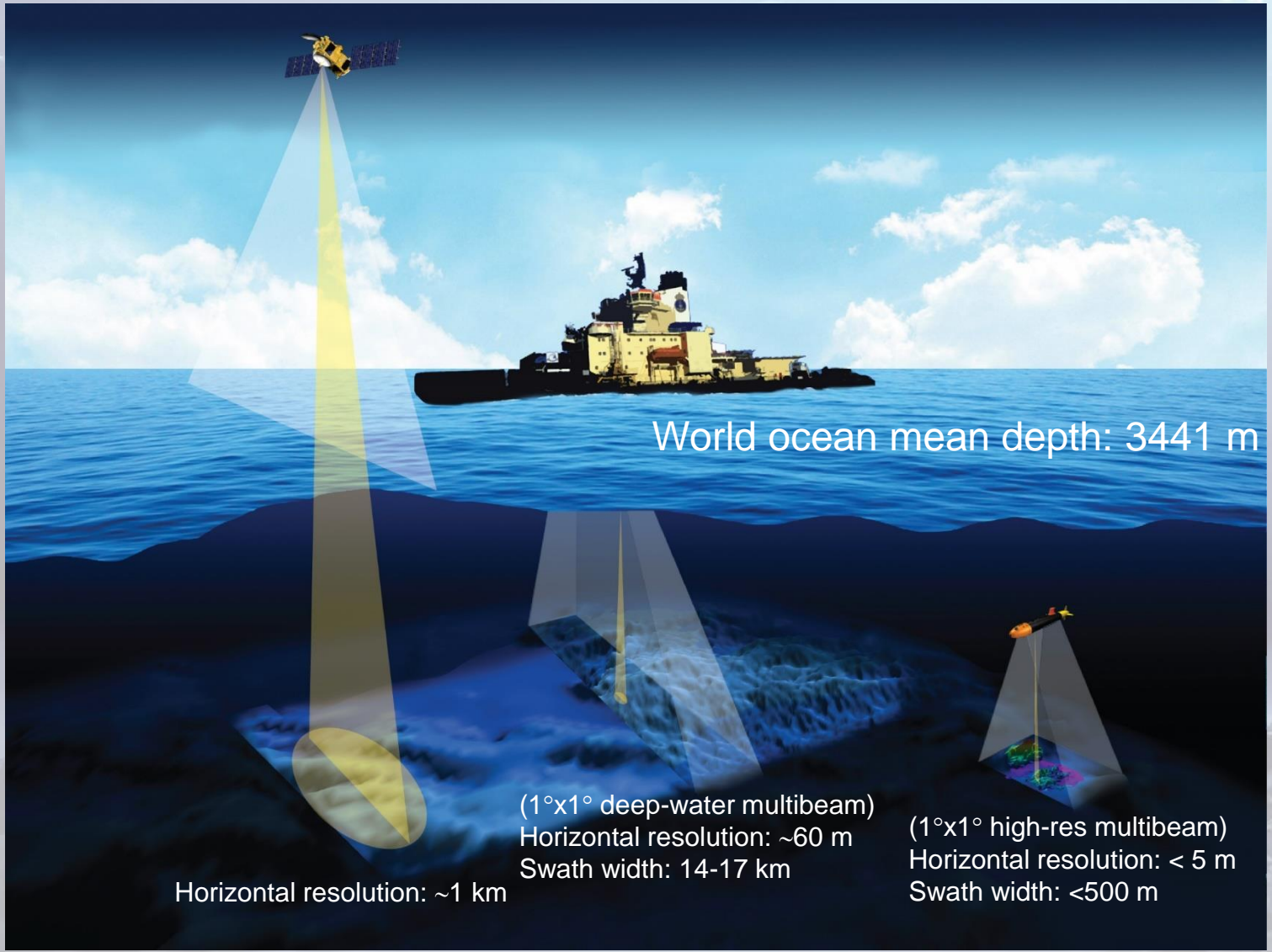
[GEBCO 2021 Bathymetry Direct Measurement -WAB \(unh.edu\)](https://gebcoco.net)

[GEBCO Globe 2021 \(unh.edu\)](https://gebcoco.net)

- *produced by Paul Johnson, UNH*
- *donated by the University of New Hampshire to Seabed 2030*



Courtesy: Paul Johnson, UNH



Seabed 2030: *A challenge with existing mapping technologies*



New technology

LELI USVs (Long Endurance Low Impact) are coming.

Example:

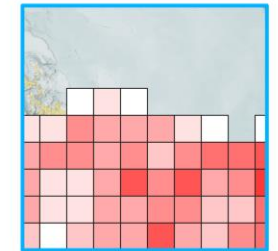
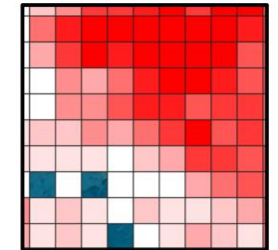
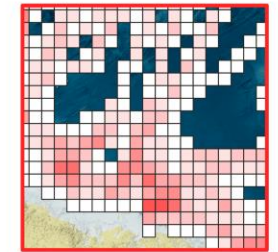
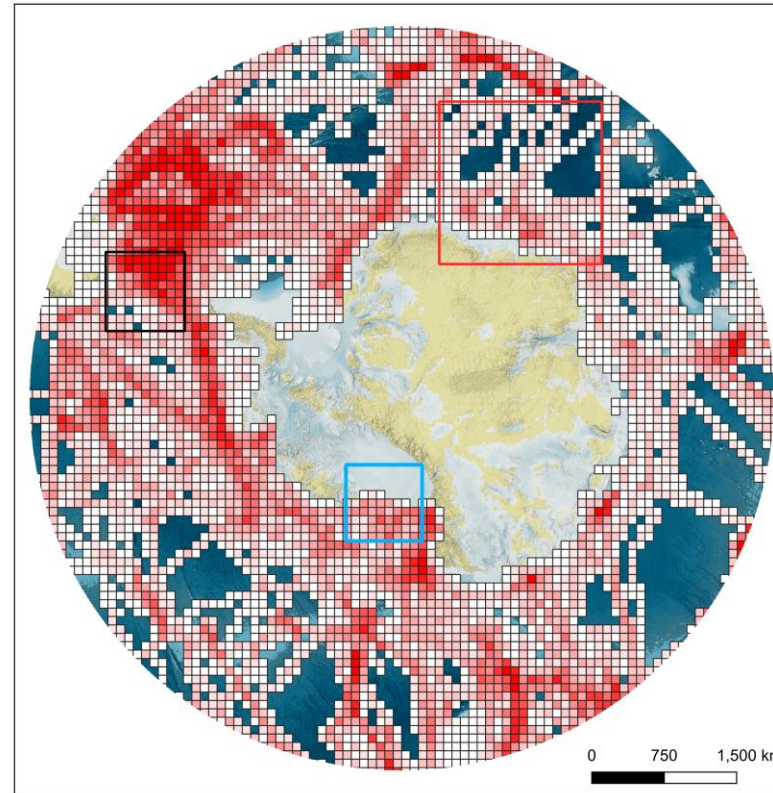
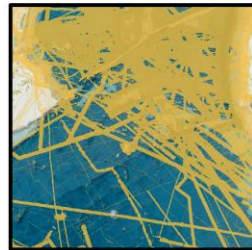
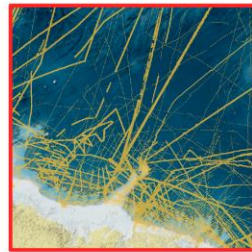
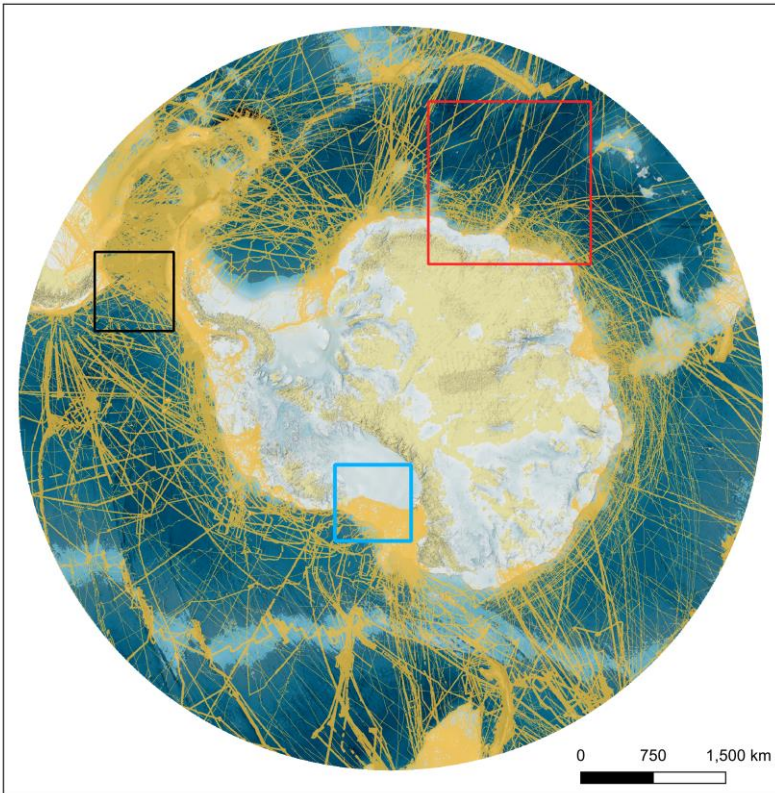
Saildrone Surveyor:

- 22m
- Up to > 6months endurance
- Deep ocean mapping capable
- Collects other ocean research data
- 10l diesel / 24hr
- Proven concept San Francisco - Hawaii



Logistics, Efficiencies, Routes

0 - 0.1 [1442] 0.2 - 0.3 [733] 0.4 - 0.5 [339] 0.6 - 0.7 [155] 0.8 - 0.9 [97] 0.9 - 1 [85]
0.1 - 0.2 [1130] 0.3 - 0.4 [490] 0.5 - 0.6 [236] 0.7 - 0.8 [109]



Seabed 2030 Outreach, growing momentum

- COP 26
- UNESCAP Sustainable Business Network
- Paris Peace Forum (SB2030 1 of 80 selected projects)
(and this is just late October / November)

- 12 New MoU's (Esri, CARIS, Kongsberg, LINZ, Scripps Inst. Ocean. and others, several new ones in progress)
- Loggers provided to 4 countries (also Greenland), industry and 3 NGO's

THE NIPPON FOUNDATION-GEBCO

SEABED 2030

Update on the Arctic Ocean from
the Seabed 2030 Arctic-Antarctic
North Pacific Regional Center

Compiled by:
Martin Jakobsson Caroline Bringensparr
Carlos Castro

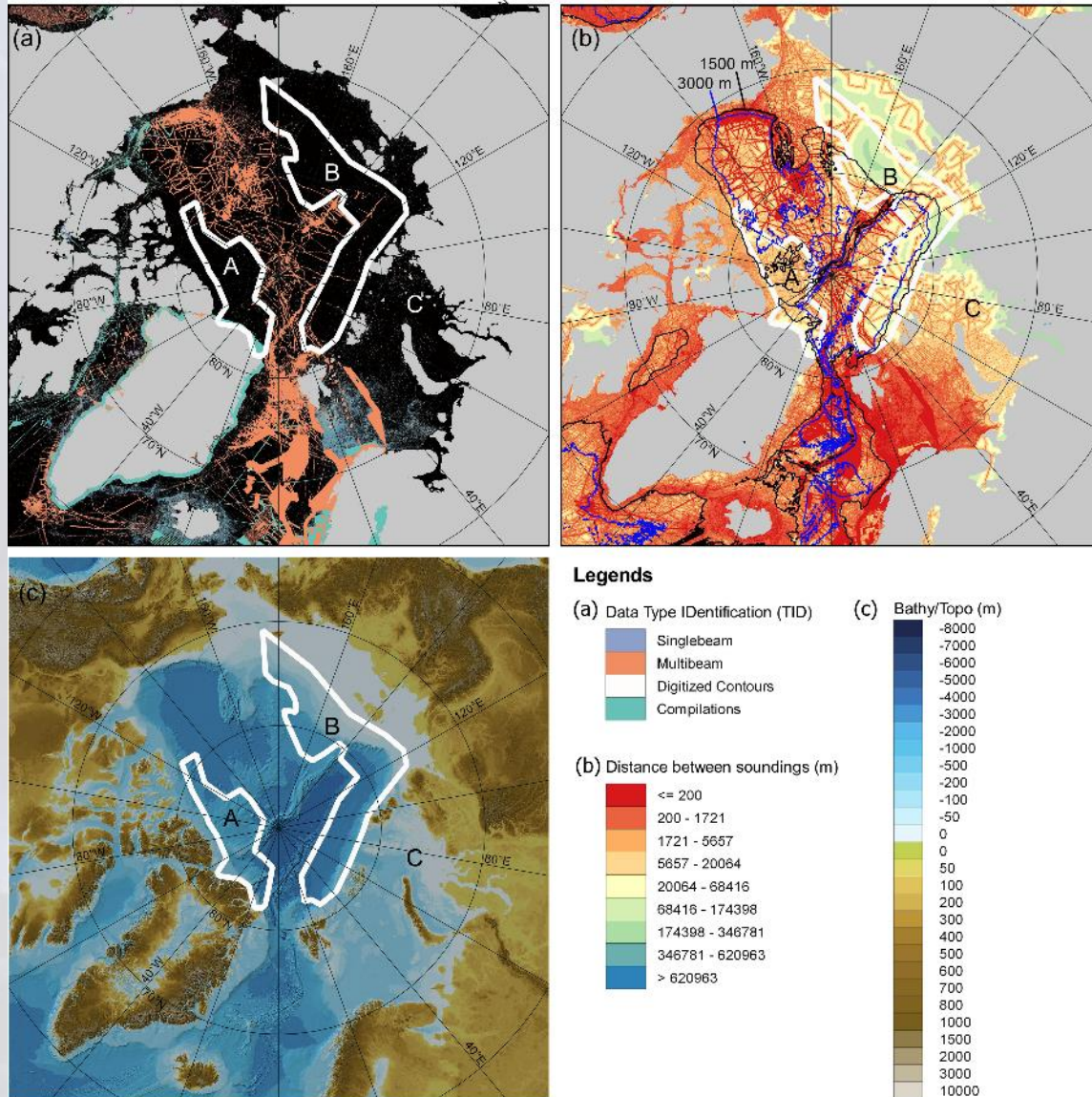


IHO

International
Hydrographic
Organization



2021
2030 United Nations Decade
of Ocean Science
for Sustainable Development



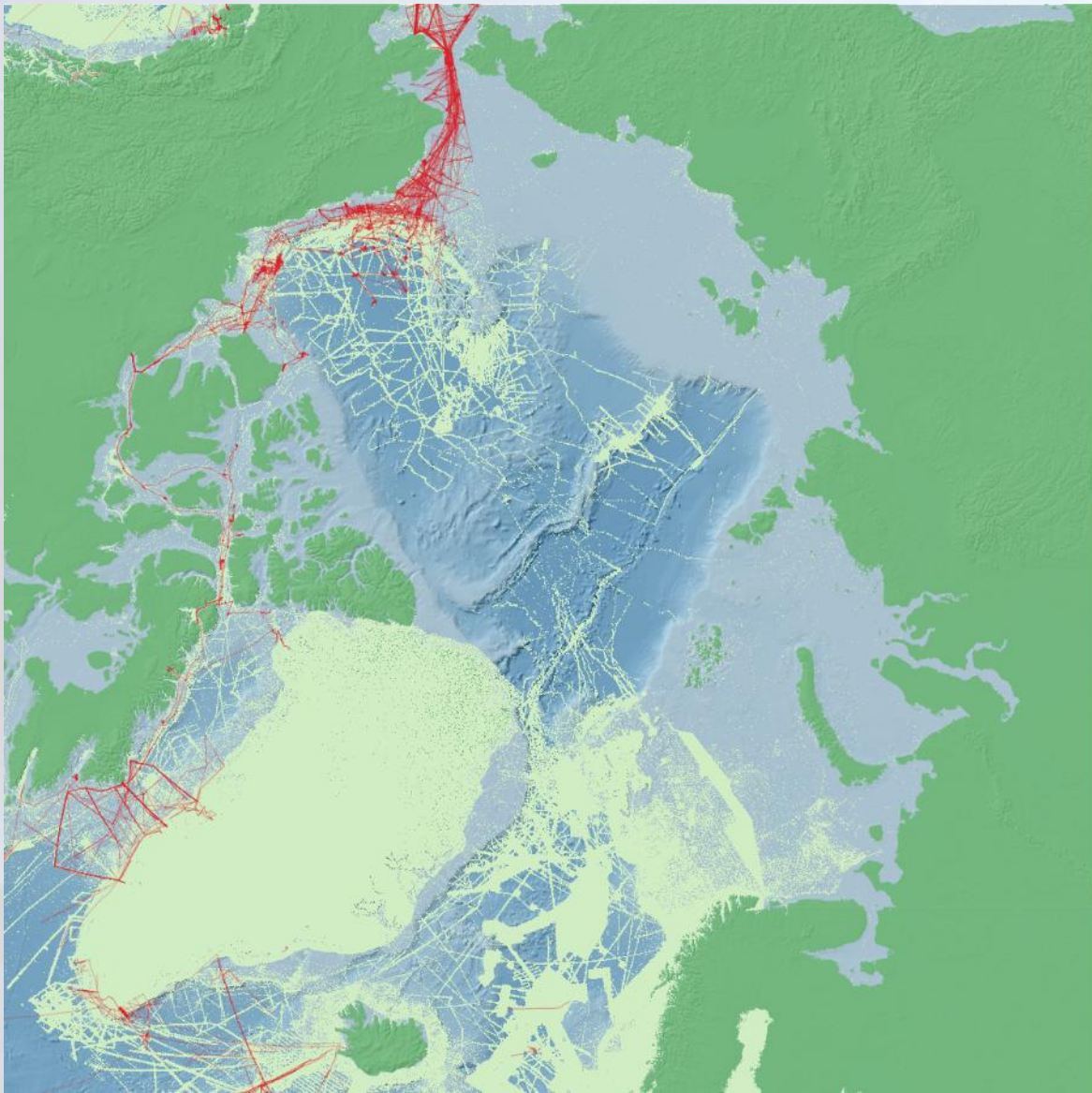
Three areas of particularly poor data coverage in IBCAO 4.1

A. Off Northern Greenland and the Canadian Arctic Archipelago

B and C. The outer continental shelves and slopes of the western Chukchi, East Siberian, Laptev, Kara and Barents seas

In area A data are scarce because of few mapping activities due to difficult ice conditions. The are likely data existing in areas B and C which not yet been contributed to IBCAO.

Figure from Jakobsson and Mayer, submitted to *Ocean Frontiers*



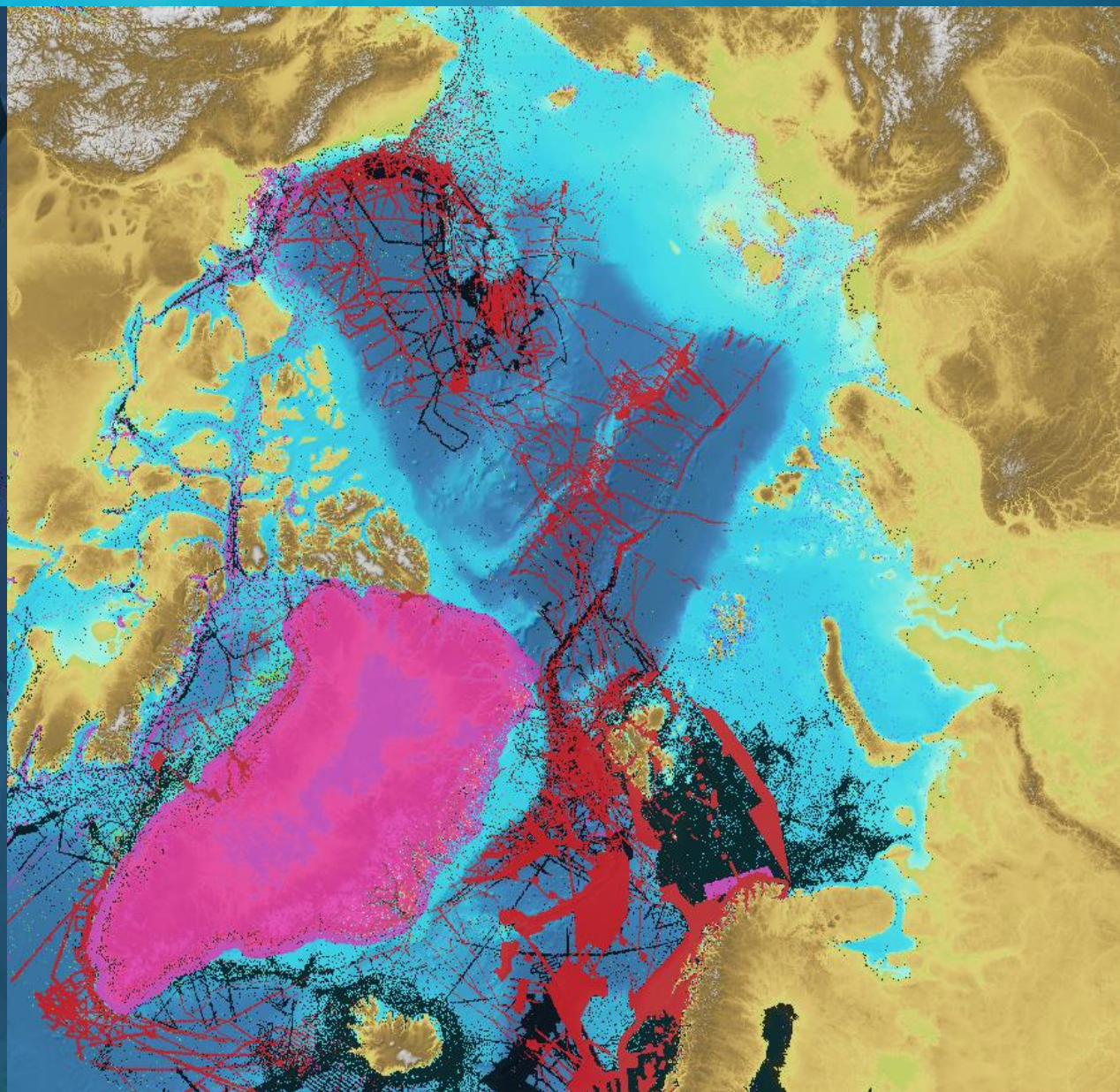
New data to be incorporated after processing. Large enhancements of the IBCAO grid specifically in US waters.

Swedish icebreaker Oden reached northern
Greenland shelf in 2021

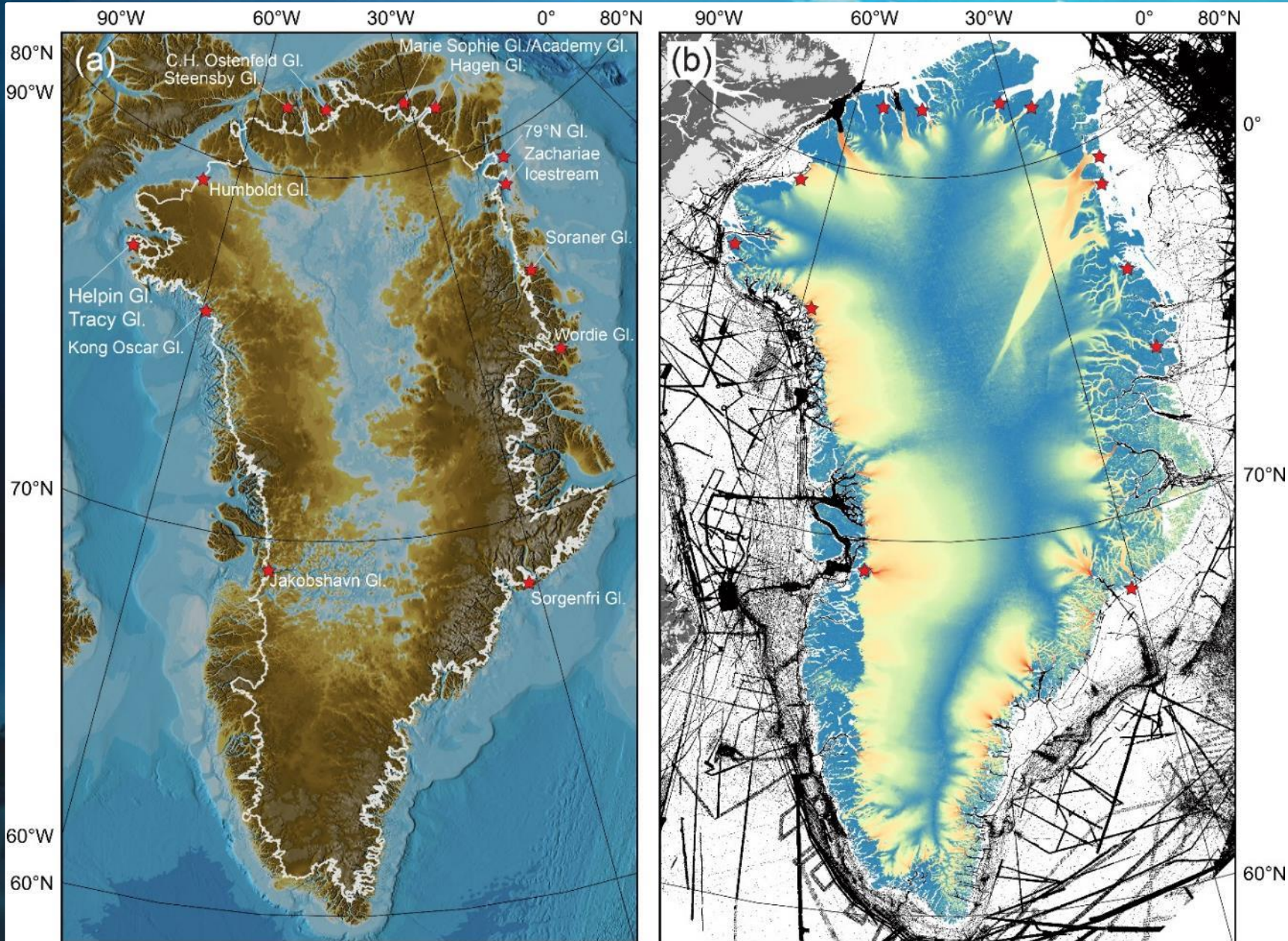
Expected 300 m,
instead 900 m



Expected deep, instead
shallow

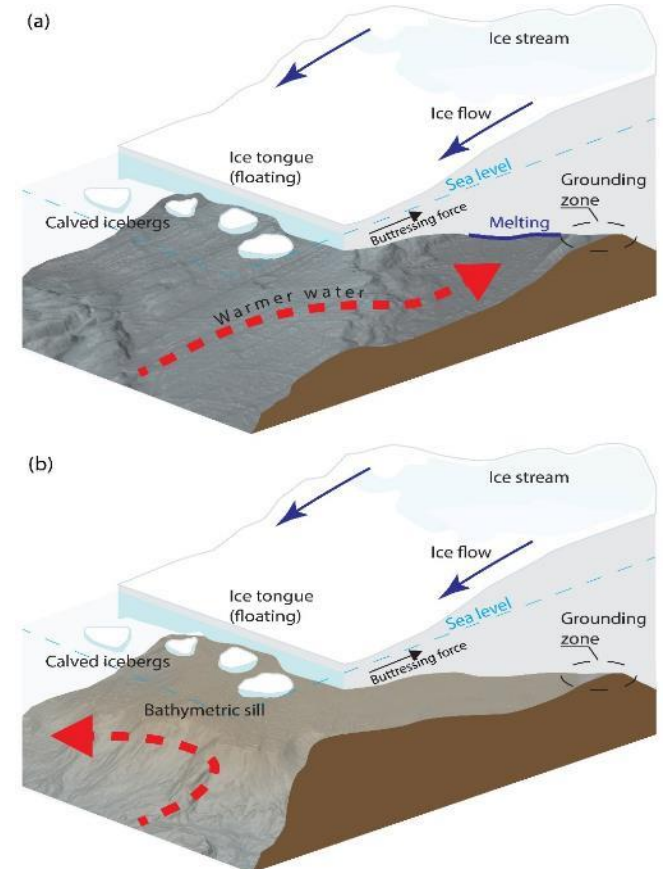


The importance to Greenland fjords for the global challenge of sea-level rise

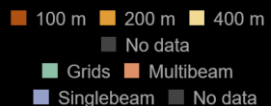
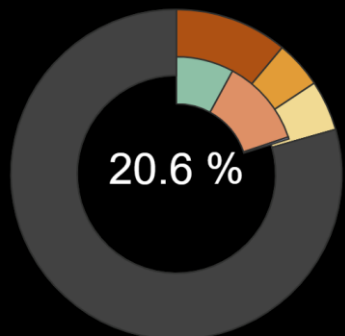


★ Marine outlet glaciers with poor or no depth data coverage

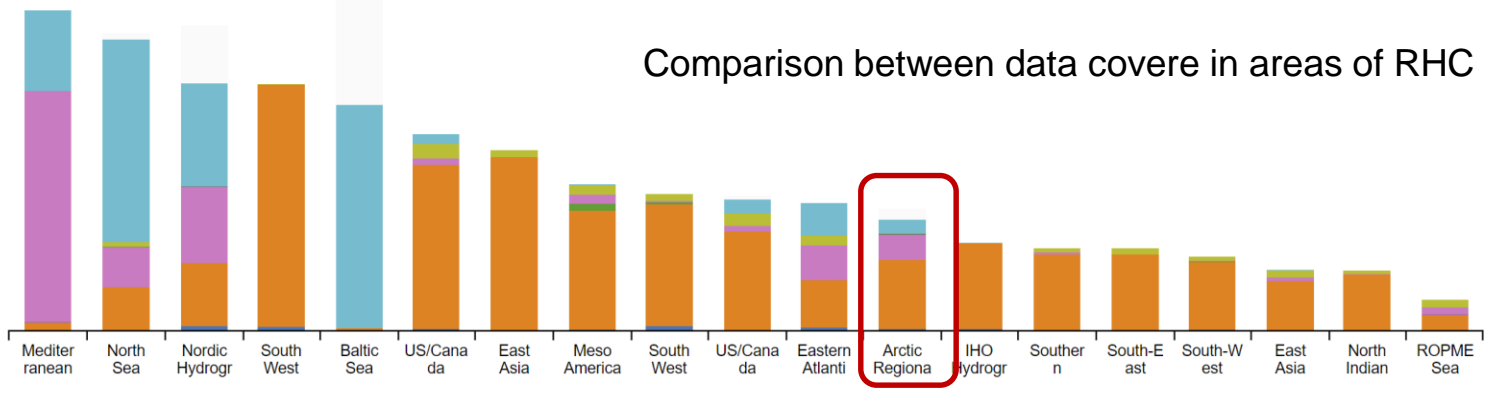
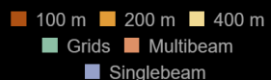
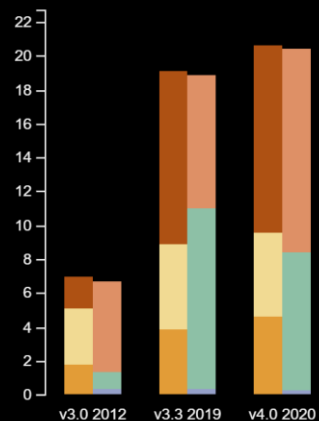
Schematic illustrations of how bathymetry may influence the inflow of subsurface warmer water in a fjord hosting a marine outlet glacier.



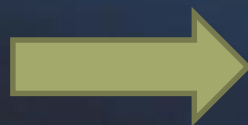
Coverage v4.0.0



Coverage

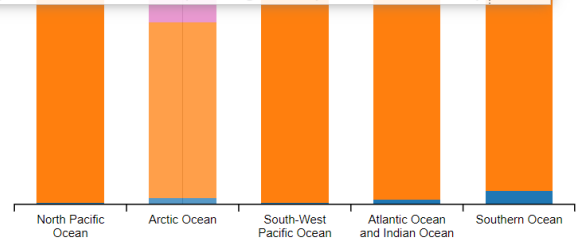


Next gridding round of IBCAO



Data centres

Arctic Ocean		
Total		21.34
Singlebeam		0.53
Multibeam		8.87
Seismic		0.00
Isolated sounding		0.03
ENC sounding		0.00
Lidar		0.00
Combination of direct measurement methods		4.73
Digital bathymetric contours from charts		0.17
Bathymetric sounding		0.61
Pre-generated grid		6.59
Unknown source		0.00
Steering points		0.02
Land (negative topography)		0.00
Upcoming, processing, (not included in total)		1.36
Interpolated based on a computer algorithm (not included in total)		1.55



THE NIPPON FOUNDATION-GEBCO



The Fourth Arctic-Antarctic North Pacific Meeting

Hosted by Stockholm University, March 21-23, 2022

Sign up to get information: caroline.bringensparr@geo.su.se



Please join us in Seabed 2030 by:

- ***Promoting*** the vital need to map the entire seabed
- ***Encouraging*** your own organisations and networks to make existing seabed mapping data available for use by Seabed 2030 in the GEBCO Grid
 - *Non commercially sensitive/sanitised data if possible*
 - *Transit data between projects*
 - **seabed2030.org/contributions**
- ***Helping*** us gather Crowd Sourced Bathymetry (CSB) for use by Seabed 2030 in the GEBCO Grid
- ***Supporting*** future seabed mapping projects where data can be used by Seabed 2030 in the GEBCO Grid
- ***Innovating*** technology that will accelerate seabed mapping

<https://www.bbc.co.uk/news/science-environment-57530394>



A world map with bathymetry data overlaid. The map shows the Atlantic Ocean, Pacific Ocean, Indian Ocean, and parts of North America, South America, Europe, Africa, and Australia. Bathymetry is indicated by color gradients from light blue (shallow) to dark blue (deep).

IHO Crowdsourced Bathymetry Initiative

- Updated Guidance document B-12
- CSB Info Flyers for:
 - Cruiseships
 - Fisheries
 - Hydrographic Offices
 - Marine Contractors
 - Marine Science Research
 - Navigation software / hardware producers
 - Super yachts

