



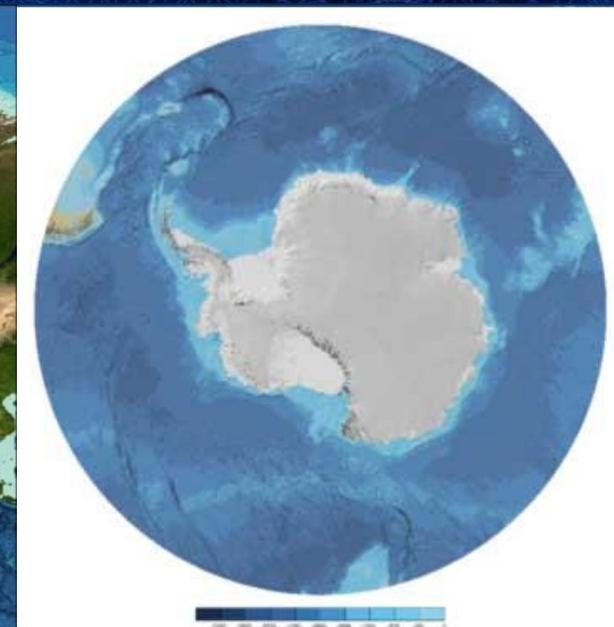
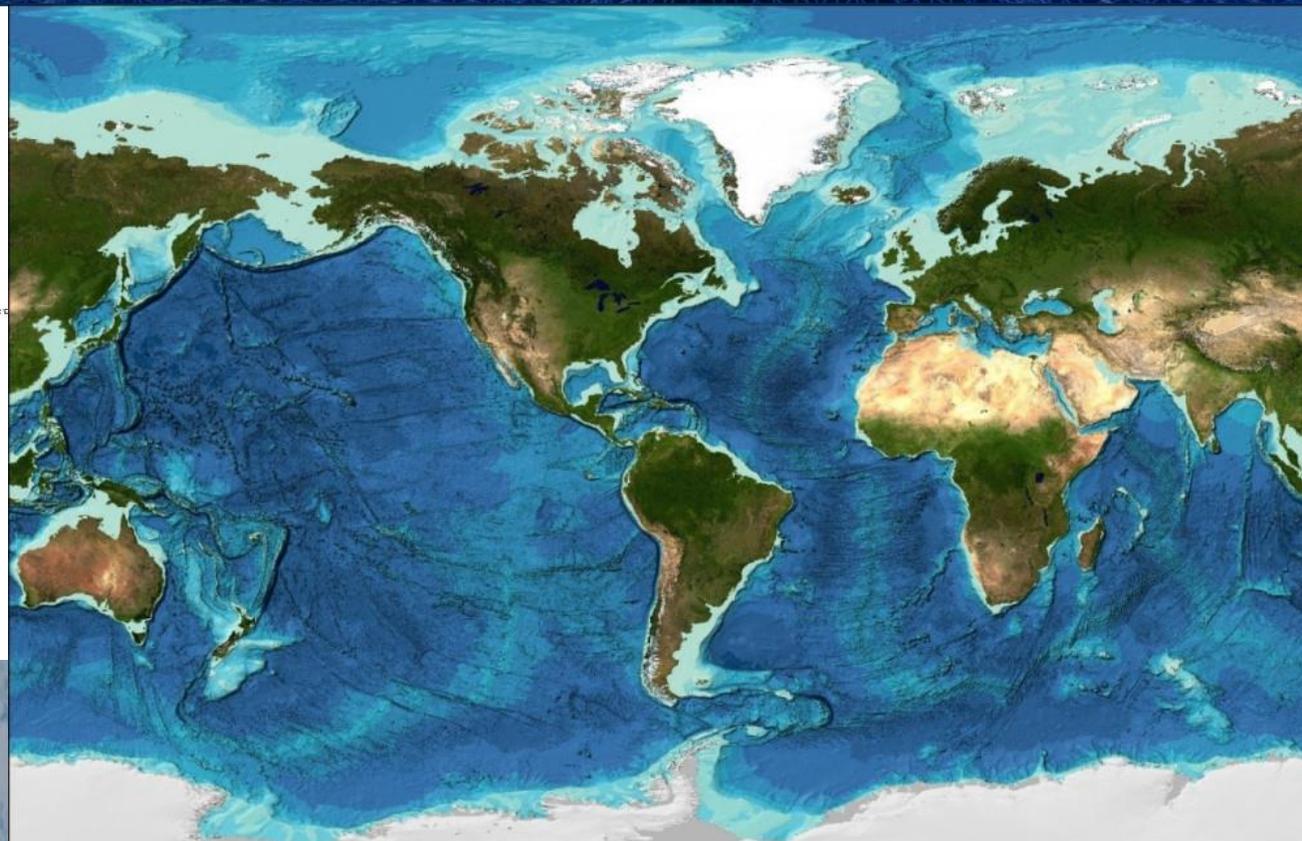
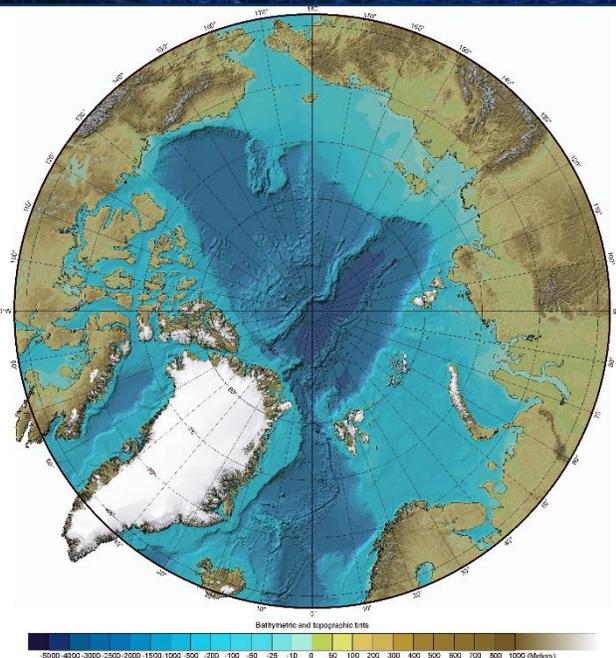
GEBCO

GEBCO



IHO

International
Hydrographic
Organization

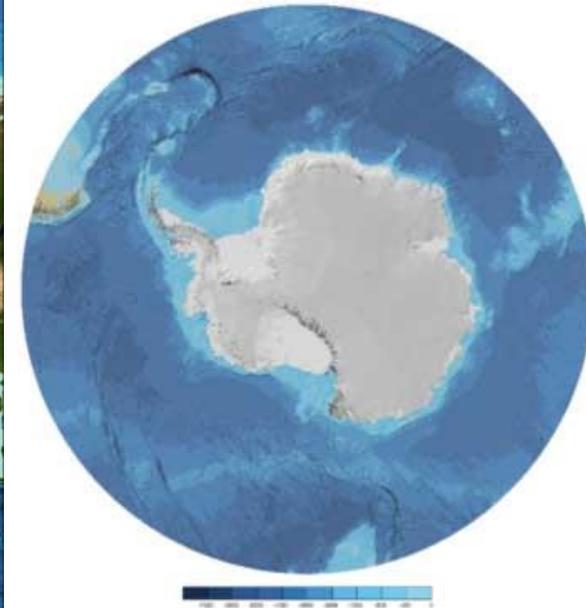
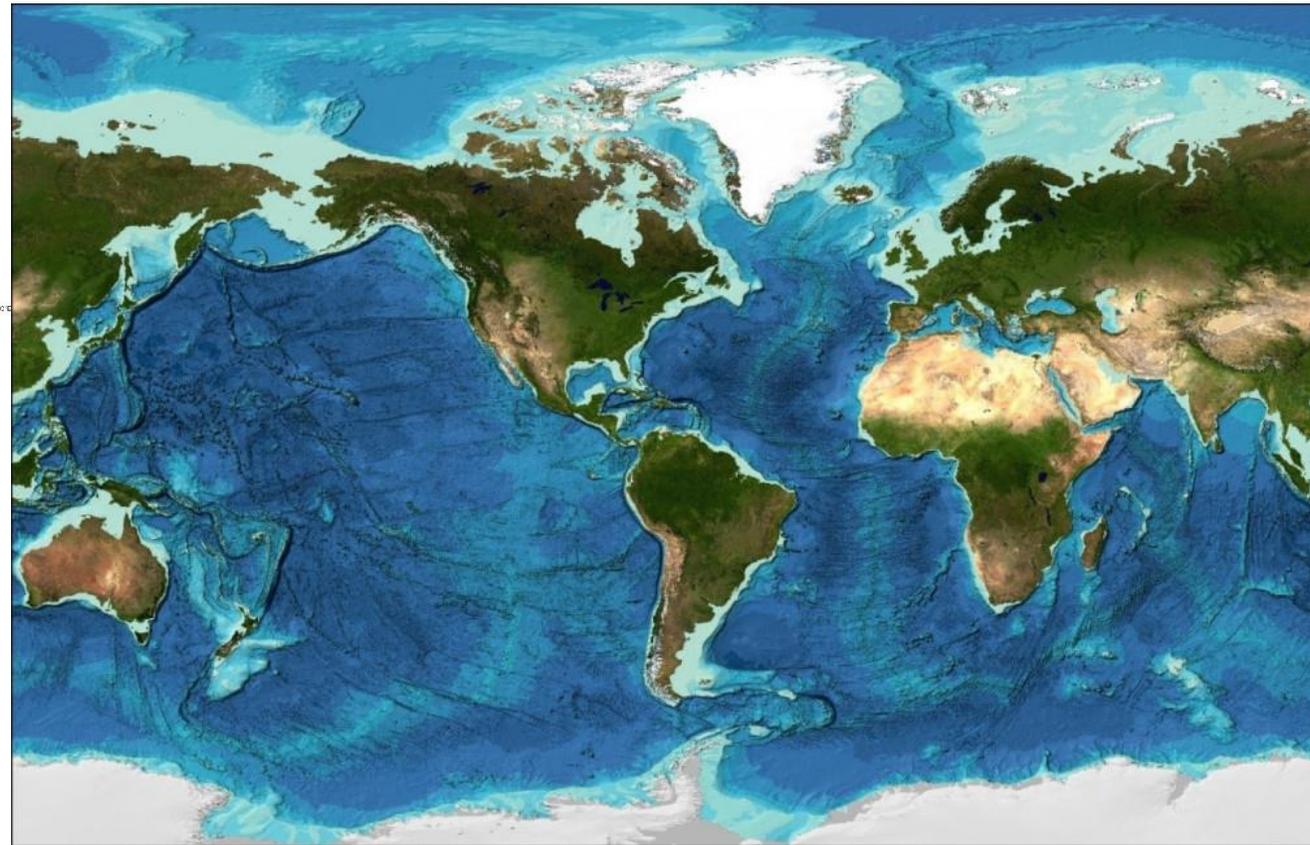
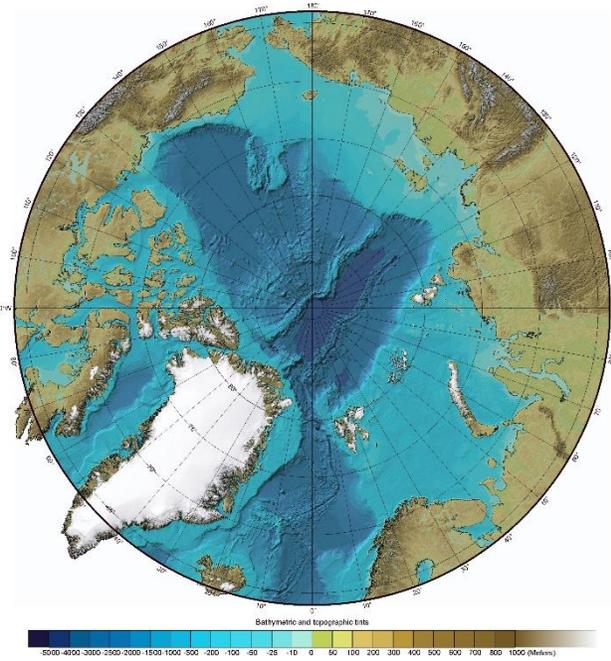


The last great mapping endeavor of our planet

ARHC13-C5
Evert Flier



GEBCO, building partnerships for ocean mapping



GEBCO-SB2030-CSB developments

- GEBCO strategy
- Governance review
- 1903-2023: 120 years of Ocean discovery: IHO + IOC Assembly
- Work started to get IHO CSB initiative endorsed as UN Decade action



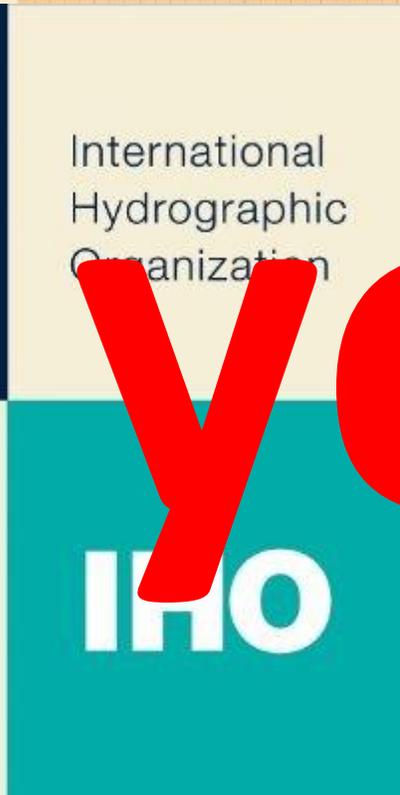
GEBCO



GEBCO program established in 1903, first edition 1905



120 years



GEBCO



IHO

International Hydrographic Organization

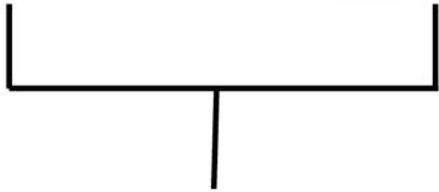


United Nations Educational, Scientific and Cultural Organization

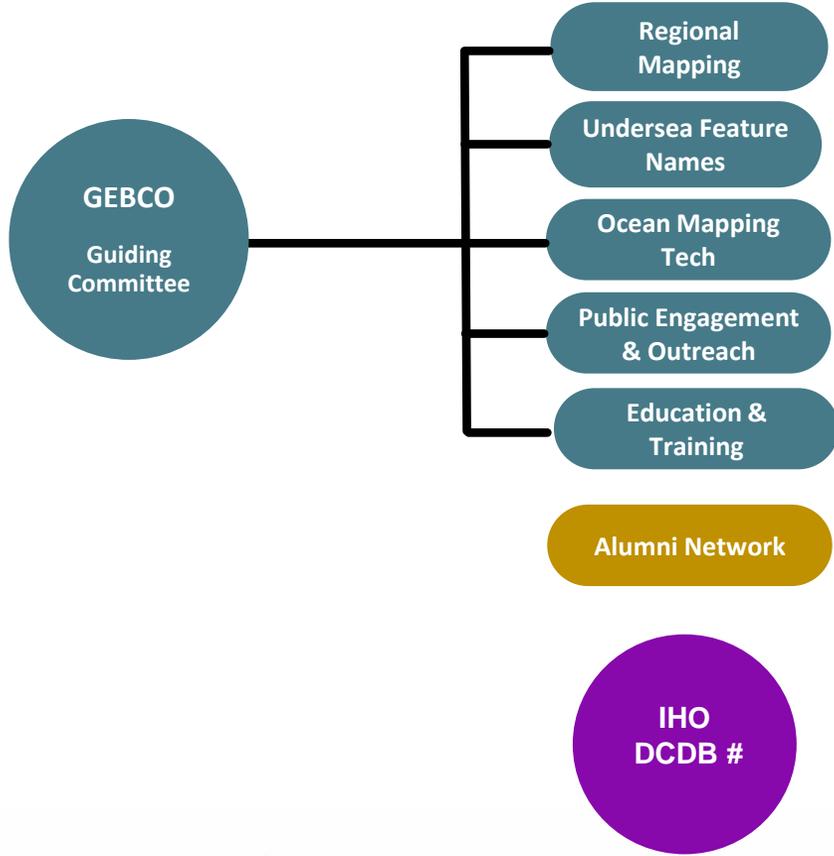
Intergovernmental Oceanographic Commission



GEBCO



GEBCO Guiding Committee



GEBCO



THE NIPPON FOUNDATION-GEBCO

SEABED
2030

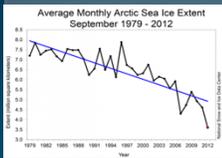
JULY 2023

SEABED 2030

Energizing Ocean Floor Mapping



Jamie McMichael-Phillips
Seabed 2030 Director



13 September 2008

12 September 2012

Arctic Ocean 80°N/156°W



Courtesy: Larry Mayer, UNH



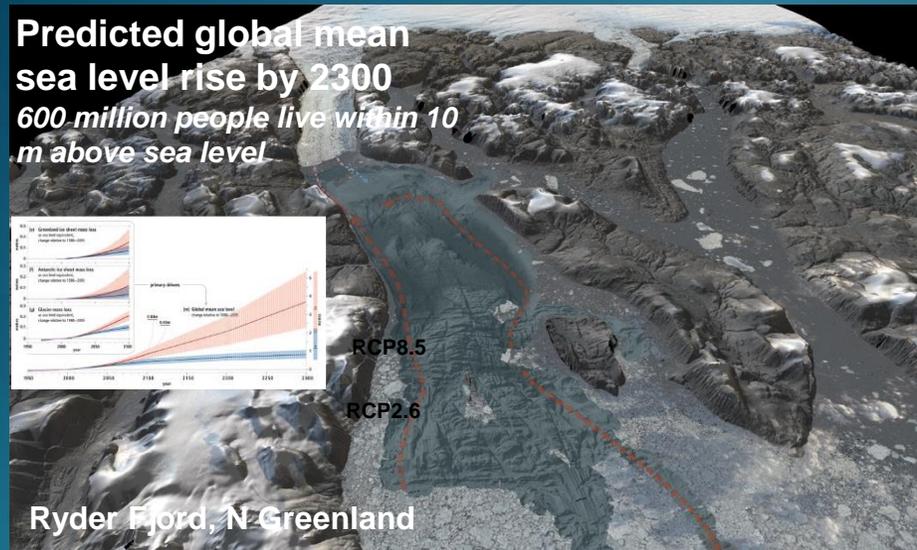
Ocean Pollution

Courtesy: Larry Mayer, UNH

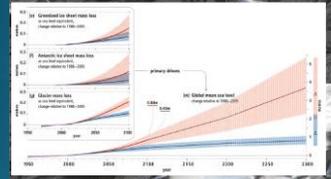


You Can't Properly Manage what you Haven't Measured

Predicted global mean sea level rise by 2300
600 million people live within 10 m above sea level



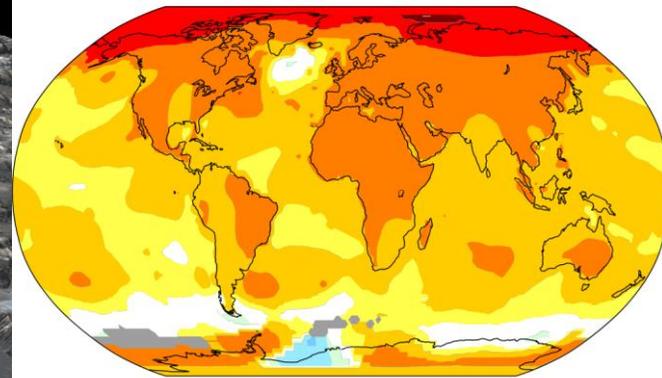
RCP8.5
RCP2.6



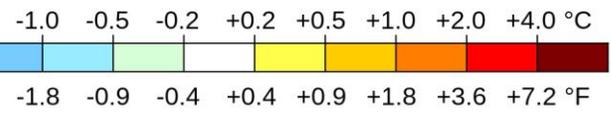
Ryder Fjord, N Greenland

Courtesy: Martin Jakobsson, SU

Temperature change in the last 50 years



2011-2021 average vs 1956-1976 baseline



Climate

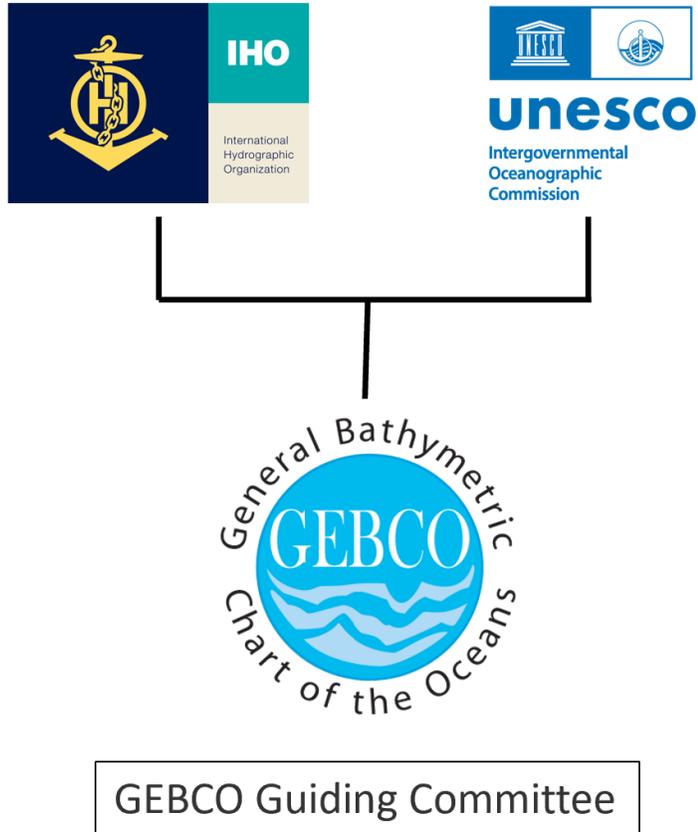
Courtesy: NASA



Alaska 1975

Courtesy: NOAA

GEBCO



Joint programme of:

- The International Hydrographic Organization (IHO)
- &
- The Intergovernmental Oceanographic Commission (IOC/UNESCO)

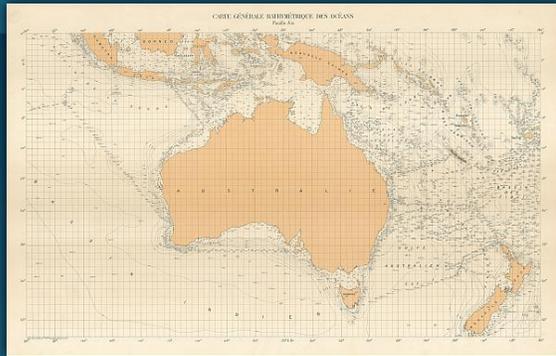
Aim: provide authoritative, publicly-available bathymetry (depth) data sets of the world's oceans

Mainly voluntary international community of:

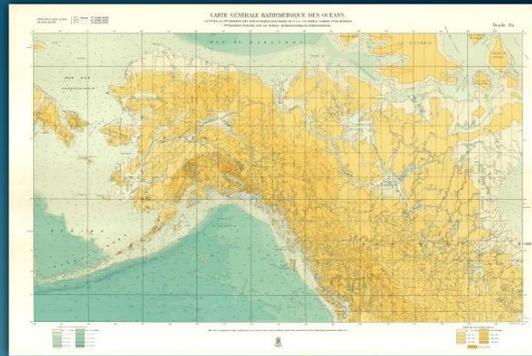
- Scientists
- Oceanographers
- Hydrographers
- Citizens

GEBCO over the decades

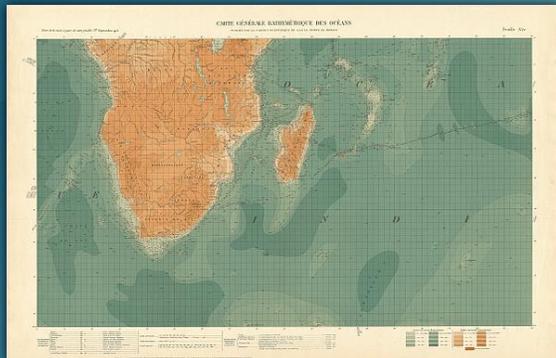
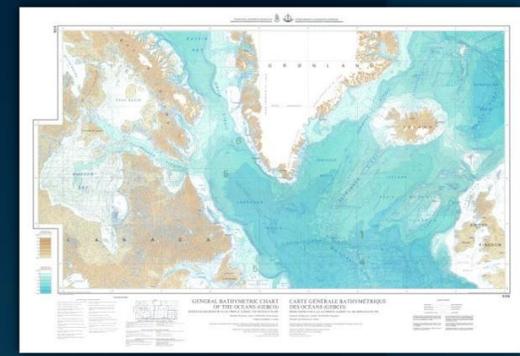
1st Edition 1903



3rd Edition 1932-66



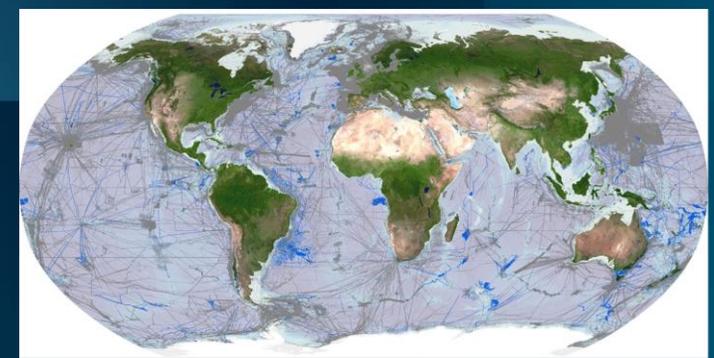
5th Edition 1973-82



2nd Edition 1910-30



4th Edition 1958-73



**2023
Release**

The Nippon Foundation-GEBCO Seabed 2030 Project



June 2016



June 2017



June 2021

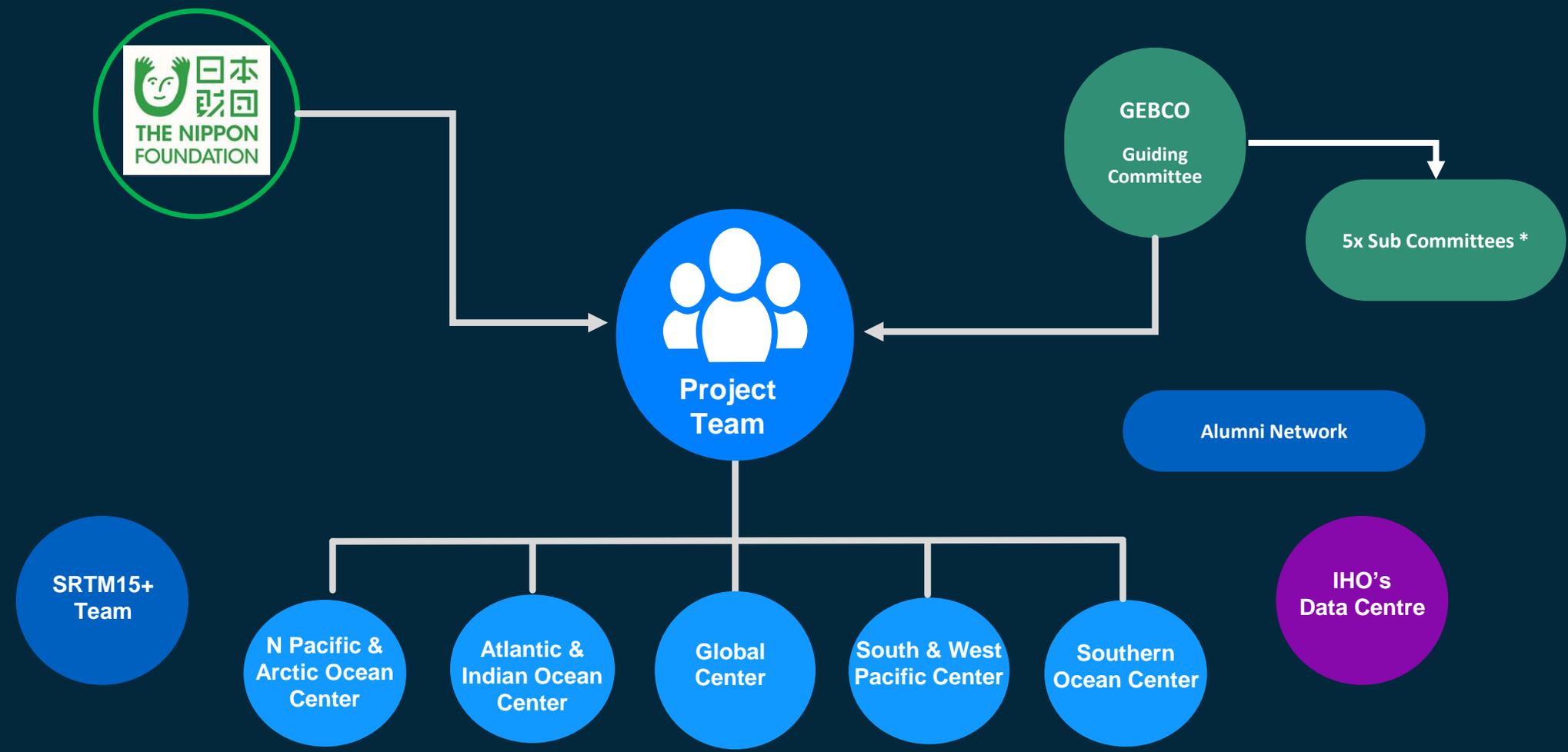


Seabed 2030 = accelerator to GEBCO's aim

Collaboration to:

- inspire 100% seabed mapping by 2030
- compile the GEBCO Map

Seabed 2030 Simplified Network



* *Technical | Regional | Undersea Feature Names | Engagement & Outreach | Education & Training*



- Clean
- Healthy & Resilient
- Productive
- Predicted
- Safe
- Accessible
- Inspiring & Engaging

OCEAN DECADE CHALLENGES

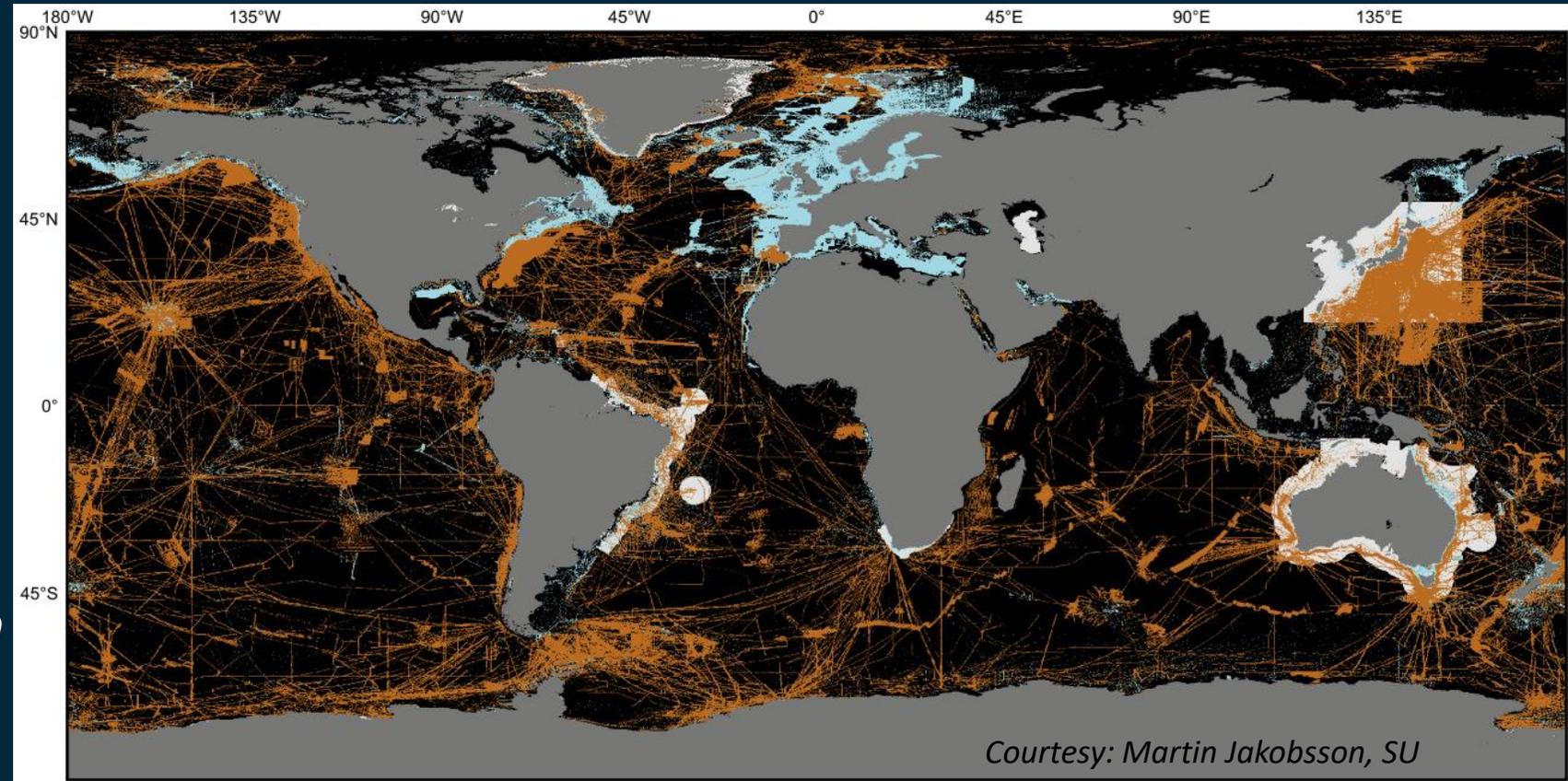
- Pollutants**
- Ecosystems**
- Food from the Ocean**
- Ocean economy**
- Ocean-climate nexus**
- Ocean-related risks**
- Ocean observing system**
- Ocean digital representation**
- Capacity development**
- Behaviour change**

- Coastal -bathymetry
- Mapping central
- Bathymetry dependent
- Mapping intensive
- Modelling, SLR, etc.
- Bathymetry intensive
- Georeferencing
- Central facility
- Strongly needed
- Resonates with people

Progress so far ...

GEBCO Map:

- *6% in 2017*
- Now **24.9%**
 - *90.1 million KM2*
 - *5 x South America*
 - *3 x Africa*



3/4 of ocean floor still to go

Target Resolutions

- Depth dependent
- We will never ask for data of any higher resolution than:
 - 1 x depth value in 100x100m box

At best only one depth value in area ~ size of a soccer pitch



THE NIPPON FOUNDATION-GEBCO

SEABED
2030

AUGUST 2023

Status of the Arctic Ocean Mapping



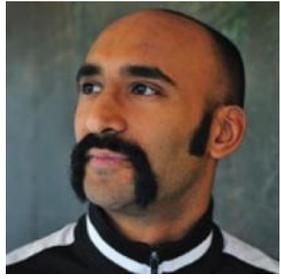
Arctic-North Pacific Ocean Regional Center



Martin Jakobsson



Larry Mayer



Rezwann Mohammad Silvia Salas Romero



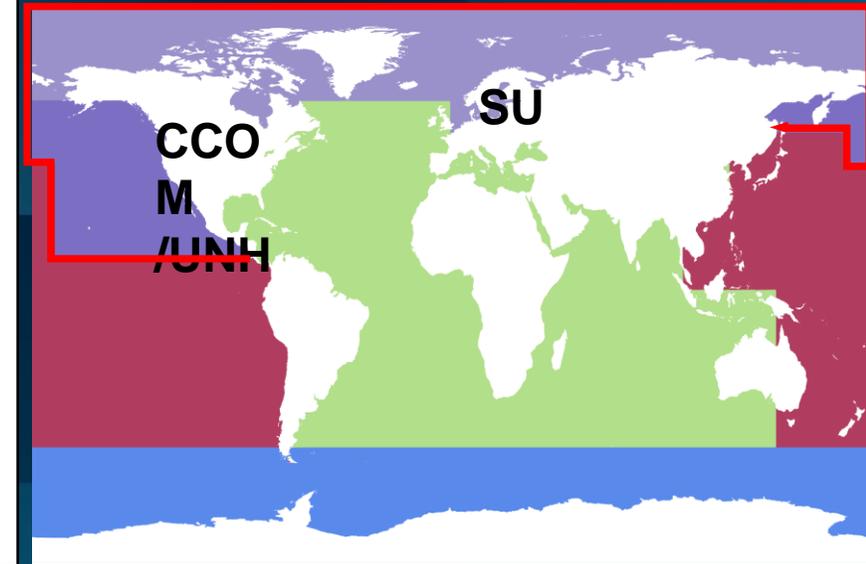
Juliet Kinney

Paul Johnson



Marcus Karlsson

Björn Eriksson

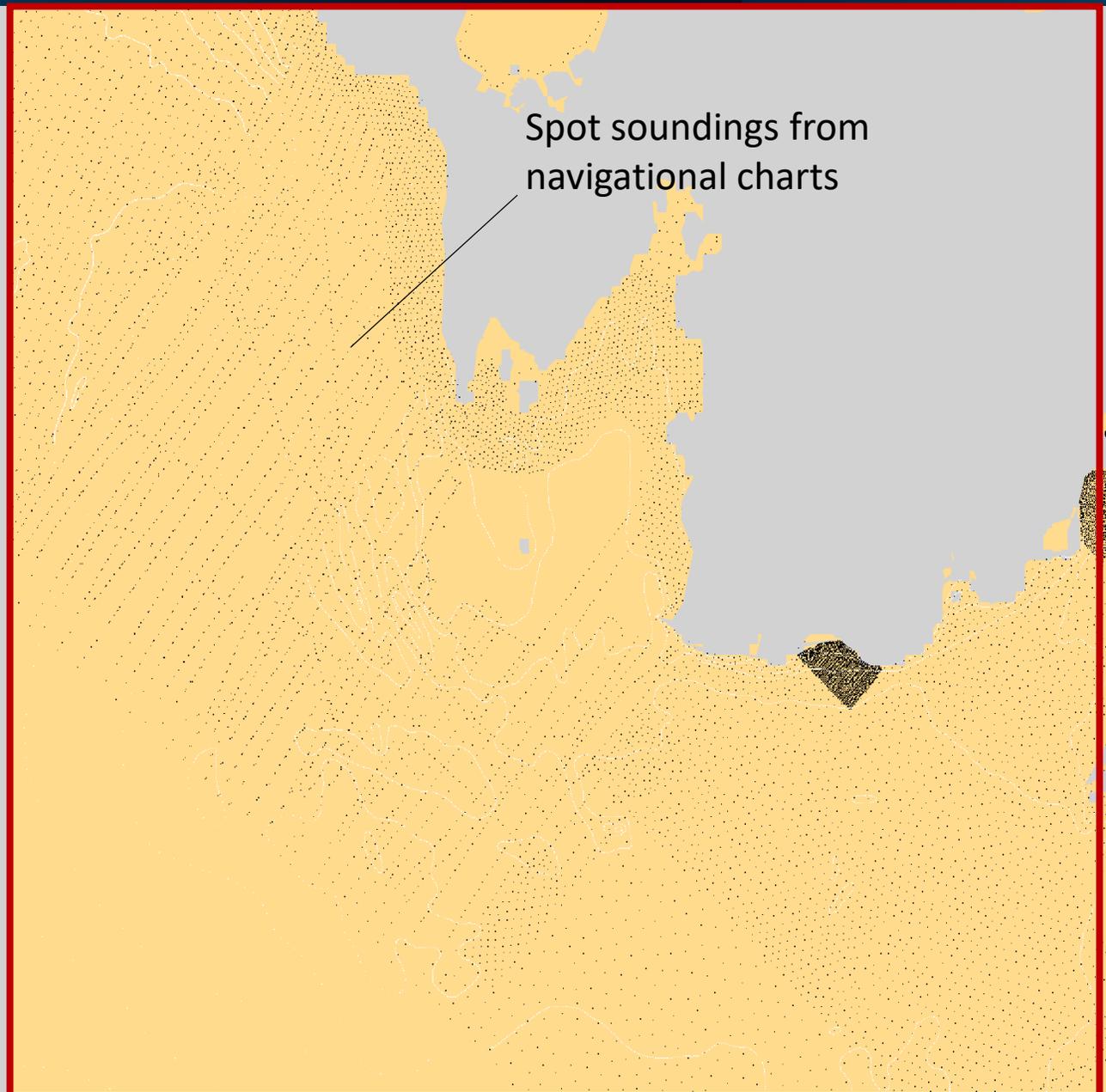
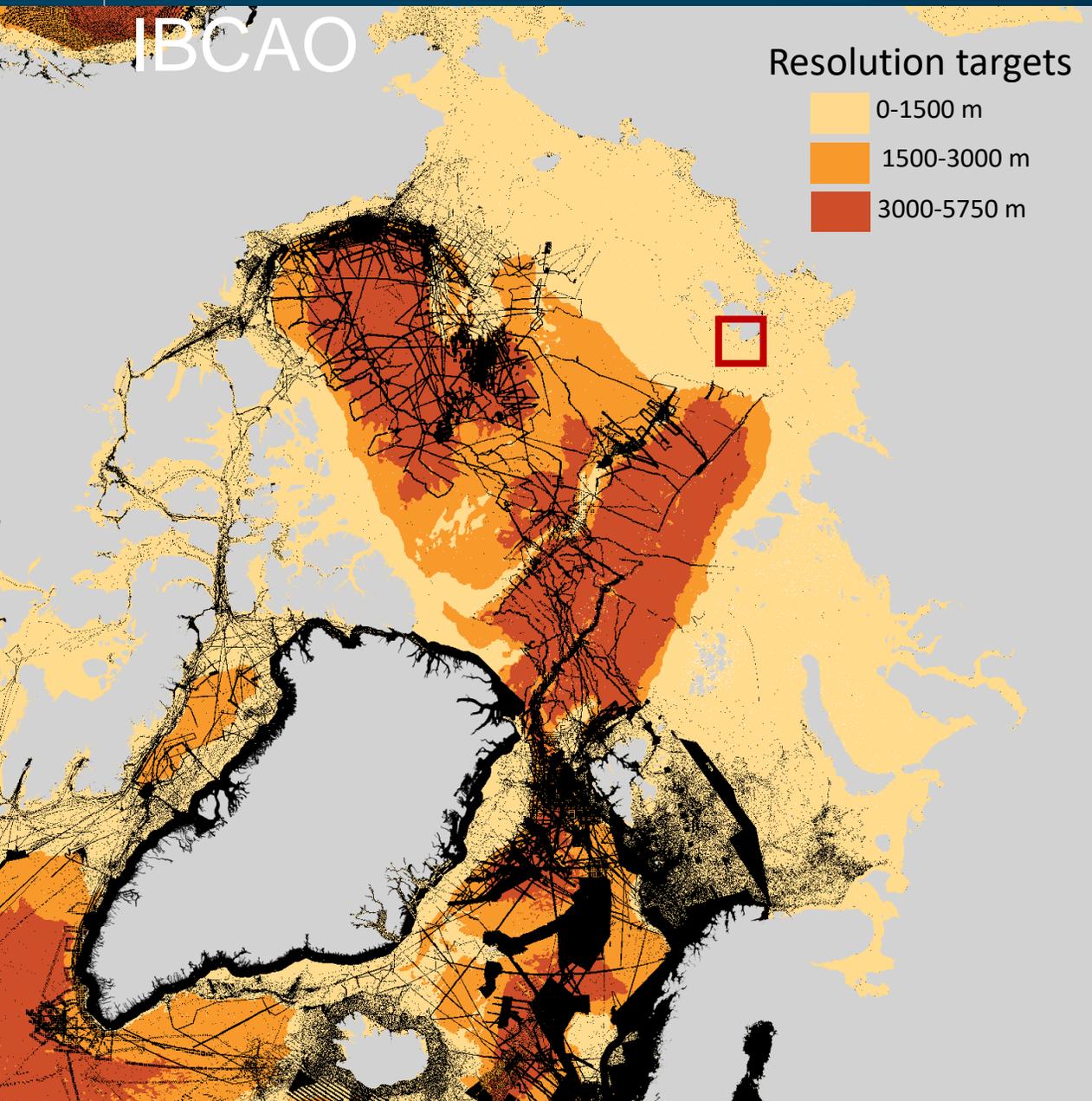


Seabed 2030 resolution targets adopted for

IBCAO

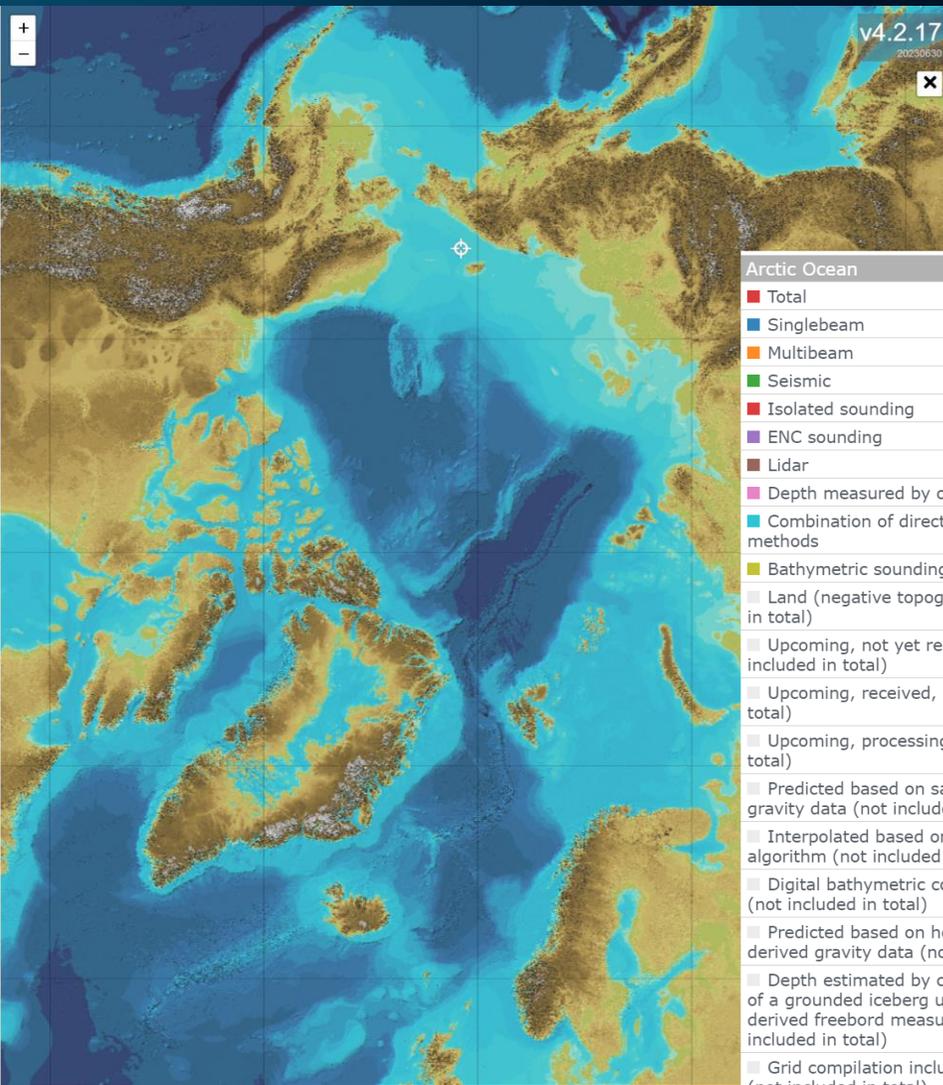
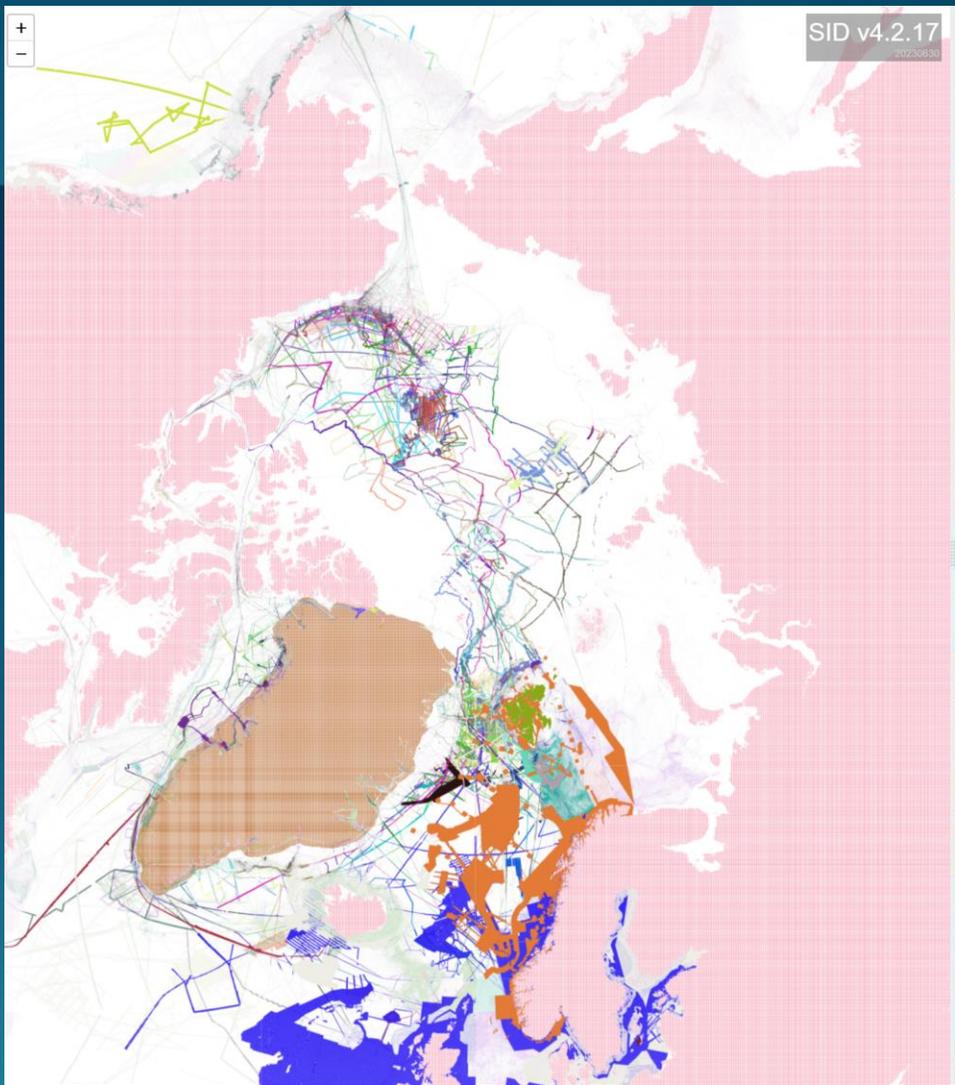
Resolution targets

- 0-1500 m
- 1500-3000 m
- 3000-5750 m



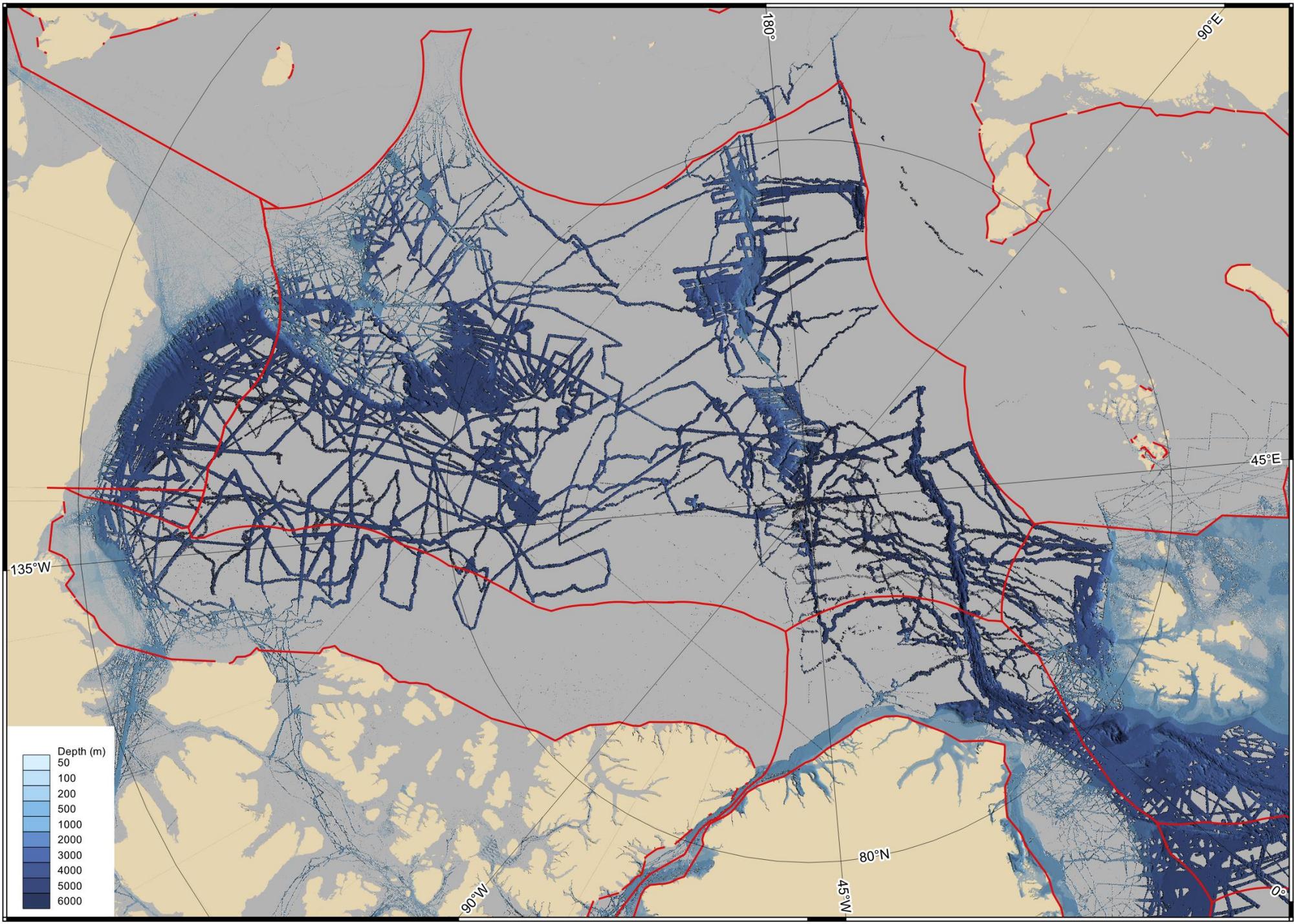
Latest grid (“work” version: gridded 2023-06-30) Version 4.2.17

Data covering an area of ca 1 % of the IBCAO region is currently undergoing processing
24.1 % mapped

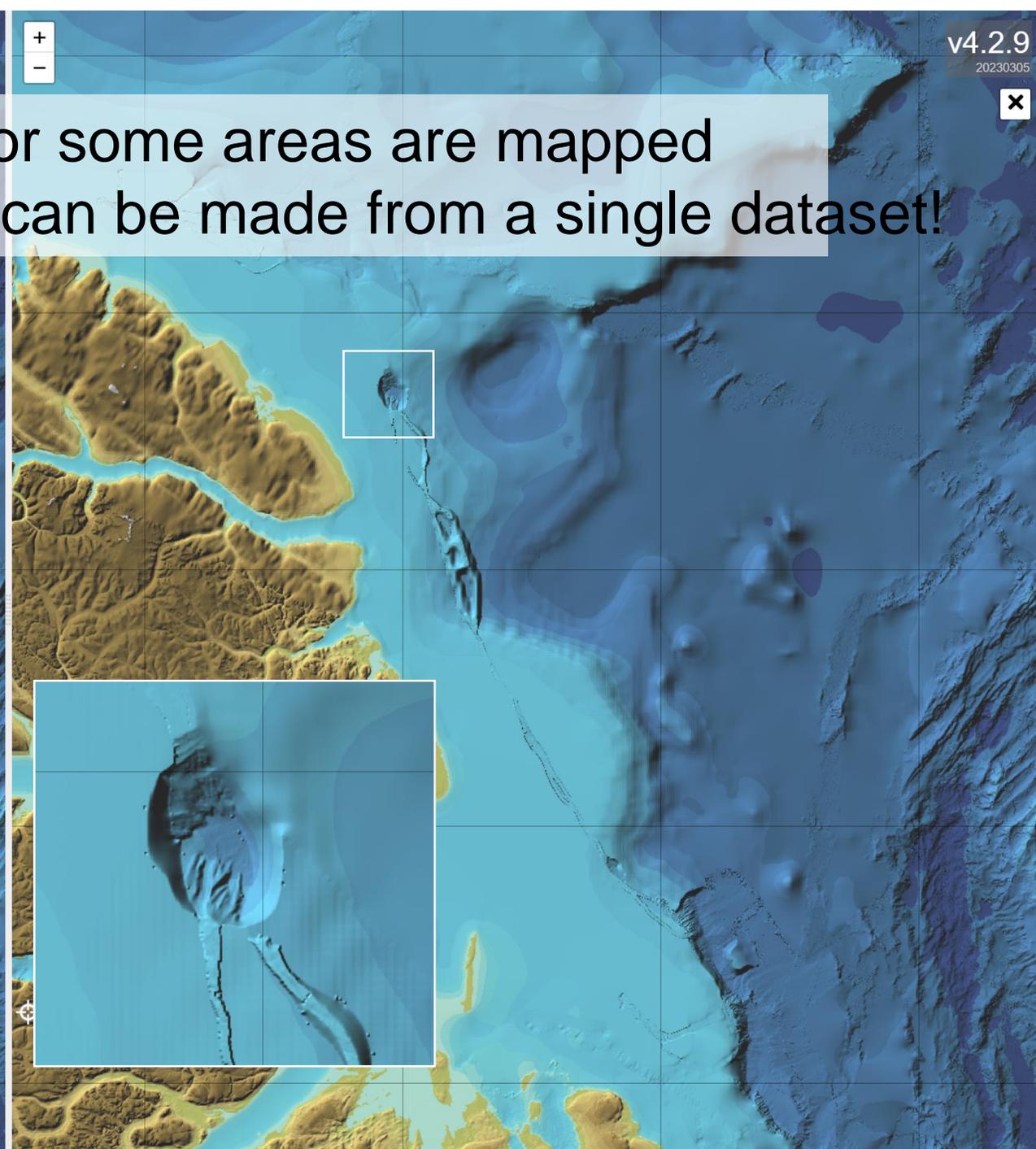
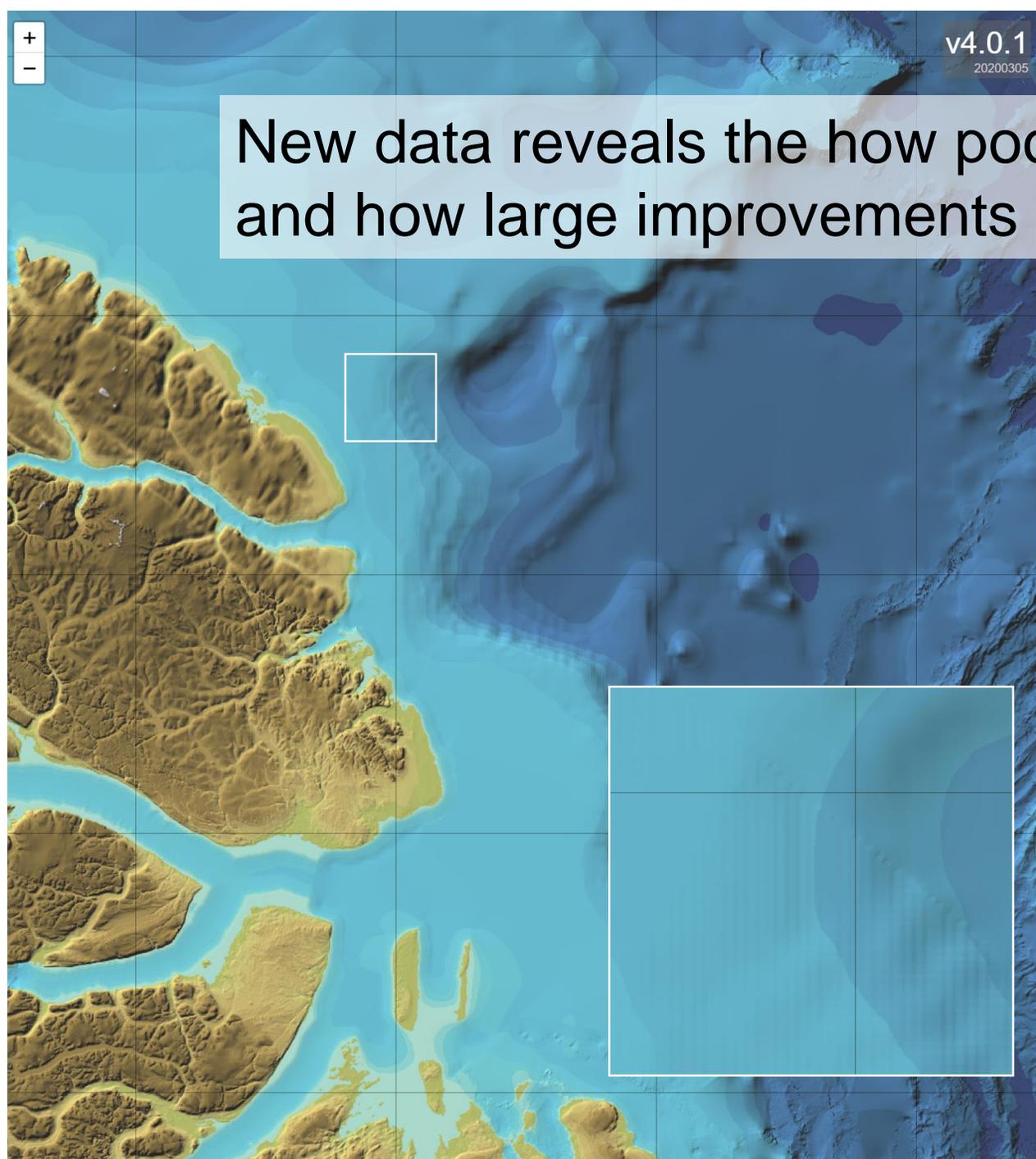


Arctic Ocean	
Total	24.10
Singlebeam	0.43
Multibeam	13.00
Seismic	0.00
Isolated sounding	0.00
ENC sounding	0.00
Lidar	0.00
Depth measured by optical light sensor	0.01
Combination of direct measurement methods	10.66
Bathymetric sounding	0.00
Land (negative topography, not included in total)	0.00
Upcoming, not yet received, (not included in total)	0.00
Upcoming, received, (not included in total)	0.02
Upcoming, processing, (not included in total)	0.97
Predicted based on satellite-derived gravity data (not included in total)	0.00
Interpolated based on a computer algorithm (not included in total)	1.54
Digital bathymetric contours from charts (not included in total)	0.16
Predicted based on helicopter/flight-derived gravity data (not included in total)	0.00
Depth estimated by calculating the draft of a grounded iceberg using satellite-derived freeboard measurement (not included in total)	0.00
Grid compilation including interpolated (not included in total)	0.77
Unknown source (not included in total)	0.00
Steering points (not included in total)	0.02

High-resolution data
used to compile IBCAO
4.2.17



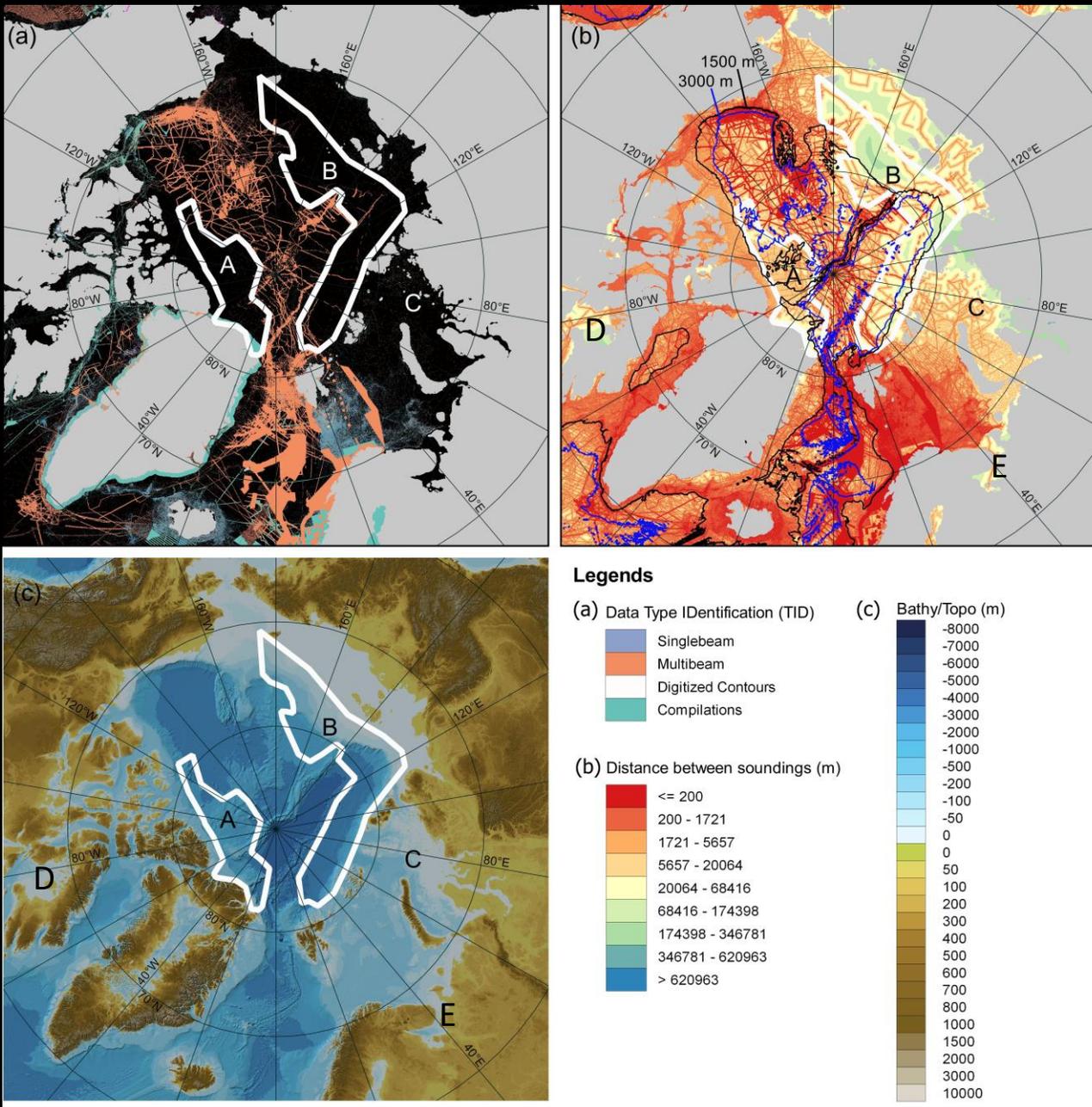
New data reveals the how poor some areas are mapped and how large improvements can be made from a single dataset!



Gap analysis from 2022 is still valid

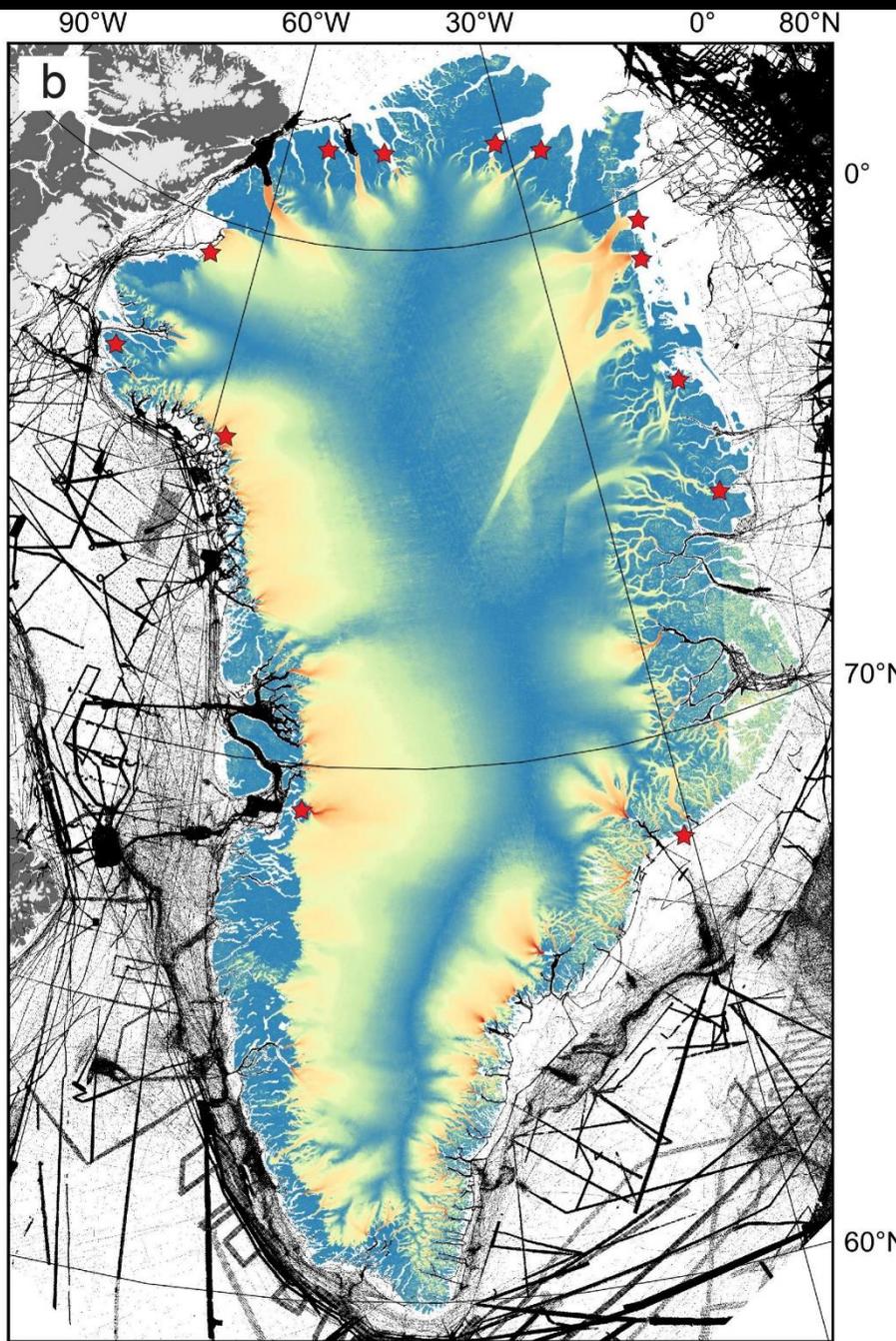
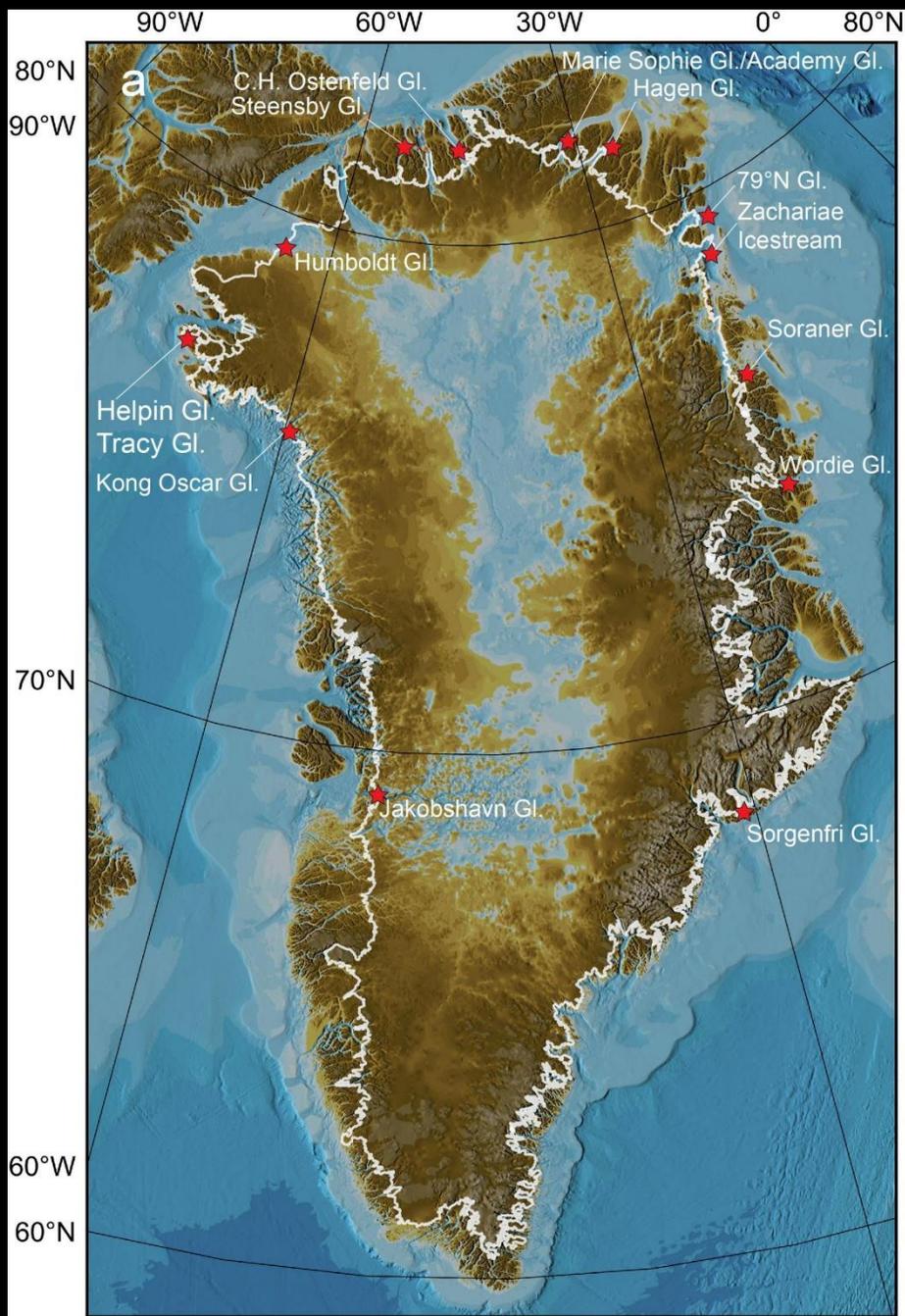
Highlights from 2022 gap analyses

1. Ca 76 % (78 % in 2022) left to map!
2. Least data constrained areas in IBCAO 4.2:
 - A) North of Greenland/Canadian Arctic Archipelago: Difficult ice conditions
 - B) East Siberian-Laptev-Kara seas' outer margins and slopes: Data exist to some extent but are not shared.
 - C) Kara sea (based on contours with unknow underlying data)
 - D) Around Prince Charles Island
 - E) White Sea



Jakobsson and Mayer, 2022, in *Frontiers in Marine Science*

Doi: <https://doi.org/10.3389/fmars.2021.788724>



Jakobsson, M., Mayer, L.A., 2022. Polar Region Bathymetry: Critical Knowledge for the Prediction of Global Sea Level Rise. *Frontiers in Marine Science* 8. Doi: 10.3389/fmars.2021.788724

Marine outlet glaciers with poor to no depth data coverage in their hosting fjords.

Download official IBCAO from GEBCO:

<https://download.gebco.net/>

The screenshot displays the GEBCO bathymetry data download interface. On the left, there is a control panel with the following sections:

- SELECT GRID VERSION:** A dropdown menu set to "GEBCO 2022: North Polar region".
- ENTER BOUNDARIES:** Four input fields for "Min x", "Max x", "Min y", and "Max y", each with a "SON RE" button and a "Clear" button.
- SELECT FORMATS:** A table for selecting file formats and grid types.
- YOUR DATA SELECTION:** A summary of the current configuration.

The main area shows a bathymetric map of the North Polar region, with landmasses in green and brown, and ocean depths in shades of blue. The map includes a search bar and a "TID" button.

	Grid	TID Grid
2D netCDF	<input type="checkbox"/>	<input type="checkbox"/>
GeoTIFF	<input type="checkbox"/>	<input type="checkbox"/>
Esri ASCII	<input type="checkbox"/>	<input type="checkbox"/>

The below options are available only on the bathymetry grid

	JPEG	PNG
Colour Map	<input type="checkbox"/>	<input type="checkbox"/>
Shaded Relief	<input type="checkbox"/>	<input type="checkbox"/>

YOUR DATA SELECTION

Grid version
GEBCO 2022: North Polar region

Bounds

Min x	Max x	Min y	Max y
0	0	0	0

File formats
Grid: none
TID grid: none

Grid dimensions
W O H O

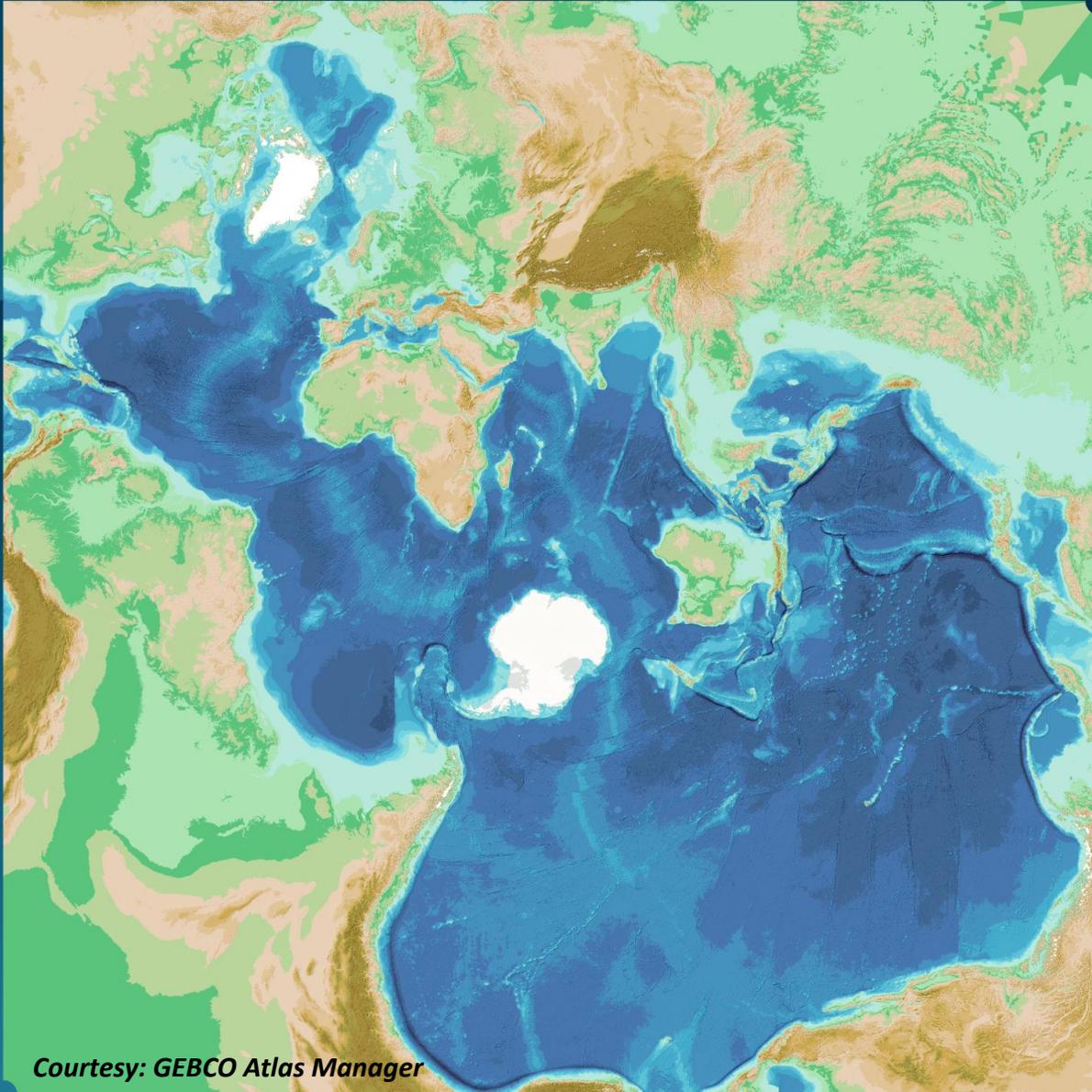
Additional news:

- Fifth Arctic-Antarctic-North Pacific Mapping Meeting, Nov 27-29, Bremen Germany

Information and registration:

<https://seabed2030.org/2023/06/08/hybrid-event-fifth-seabed-2030-arctic-antarctic-north-pacific-mapping-meeting/>

- IBCAO 5.0 is scheduled to be completed following the meeting in Bremen, and released for public download in the first part of 2024
- IBCAO 5.0 will be also include a new layout map that can be printed following the style of previous printed IBCAO maps.



Courtesy: GEBCO Atlas Manager

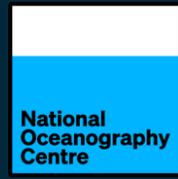
It really is

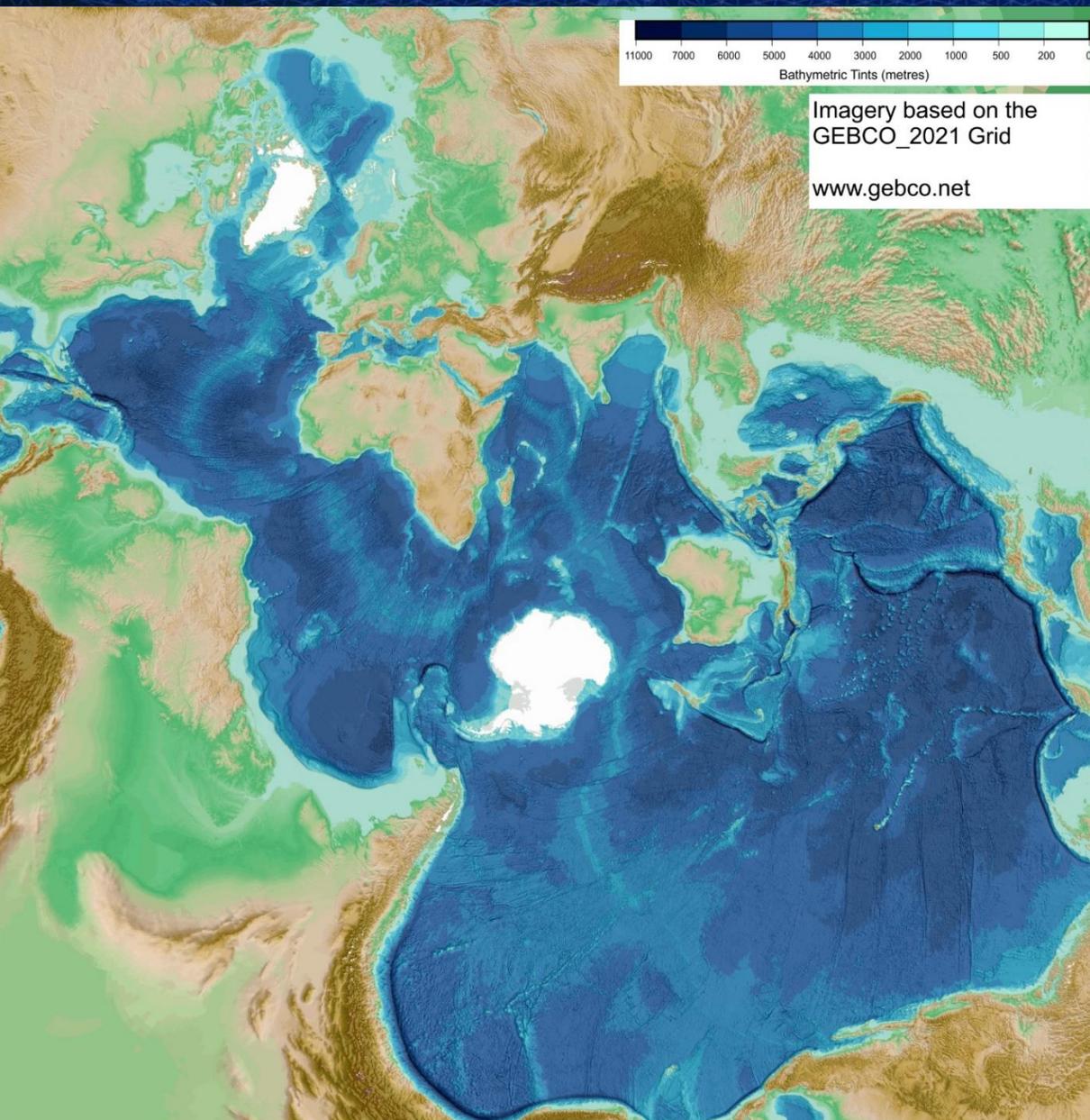
Our One Ocean!

Vision:

**100% Ocean Floor
mapped by 2030**

Thank you





GEBCO,
the foundation
of the Digital
Twin of the
Ocean