



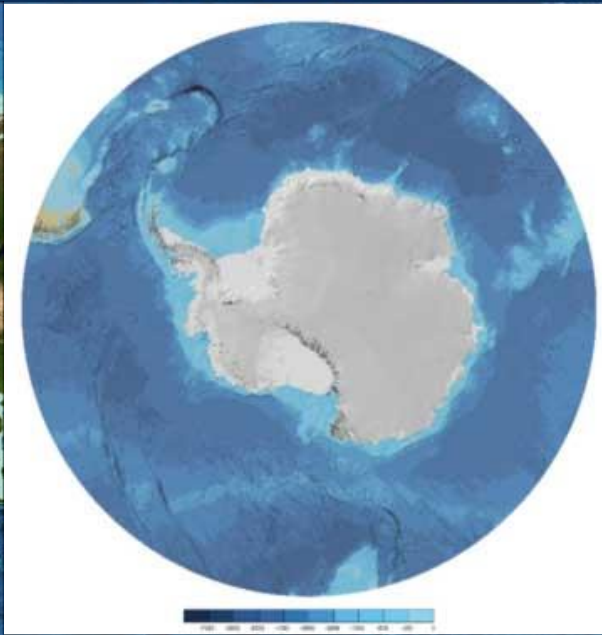
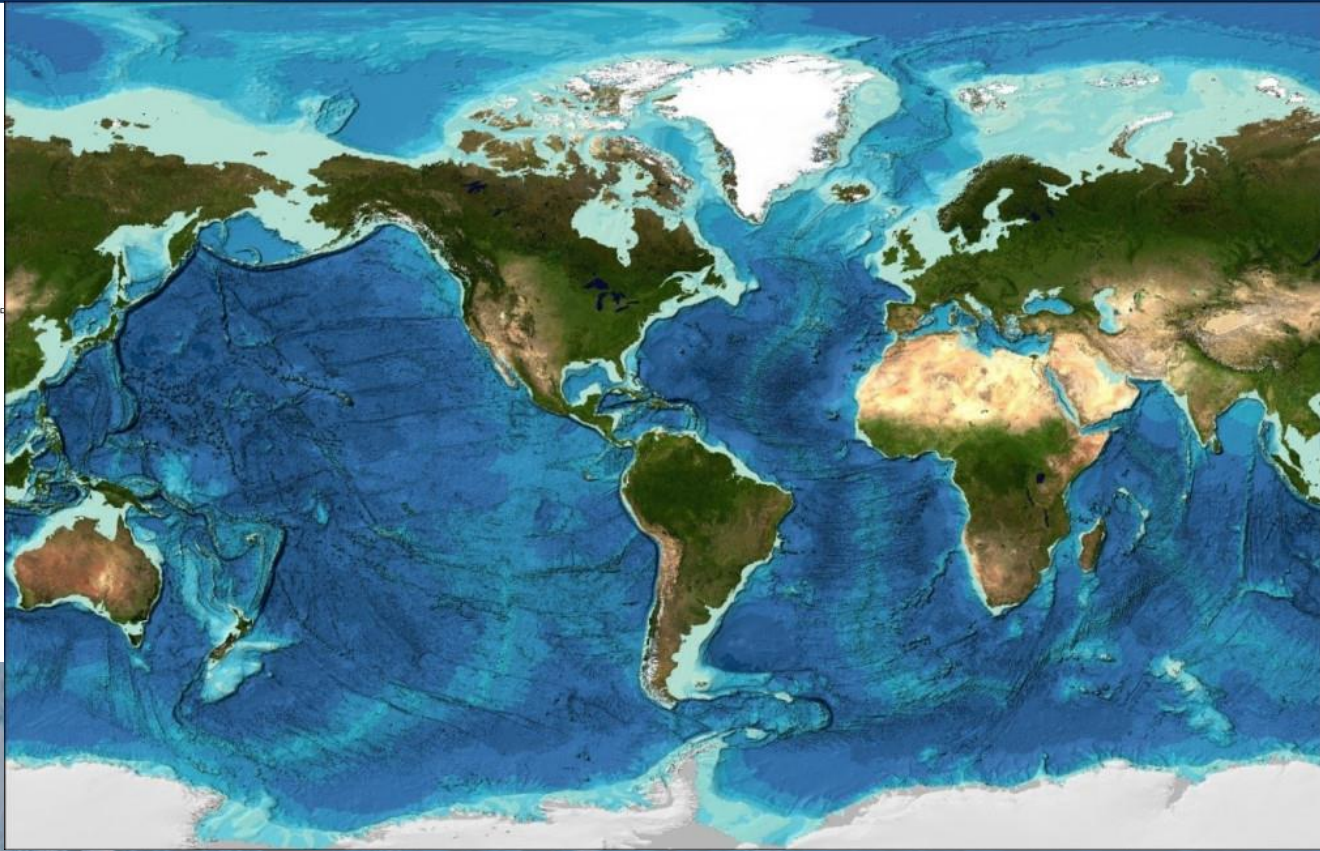
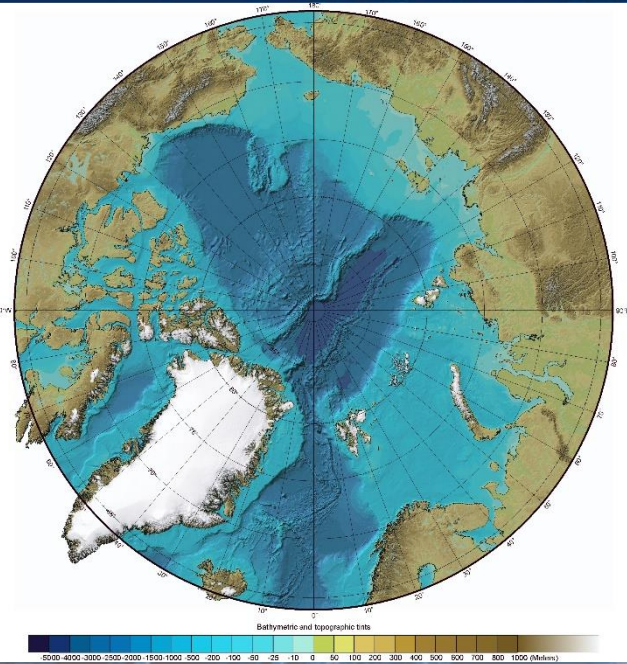
GEBCO

GEBCO



IHO

International Hydrographic Organization

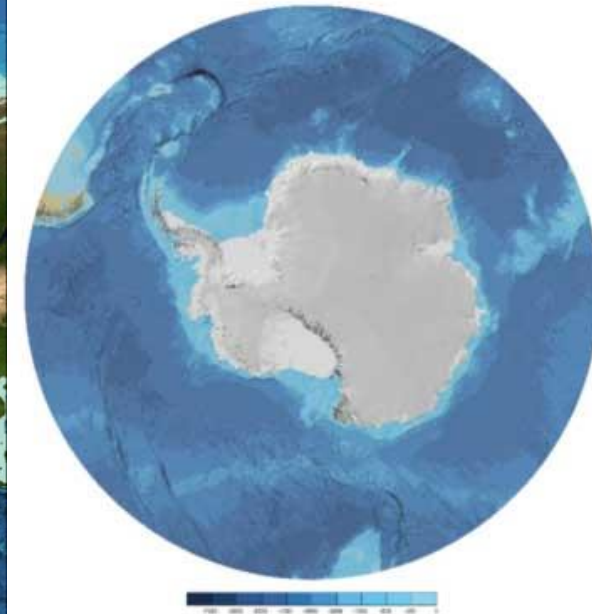
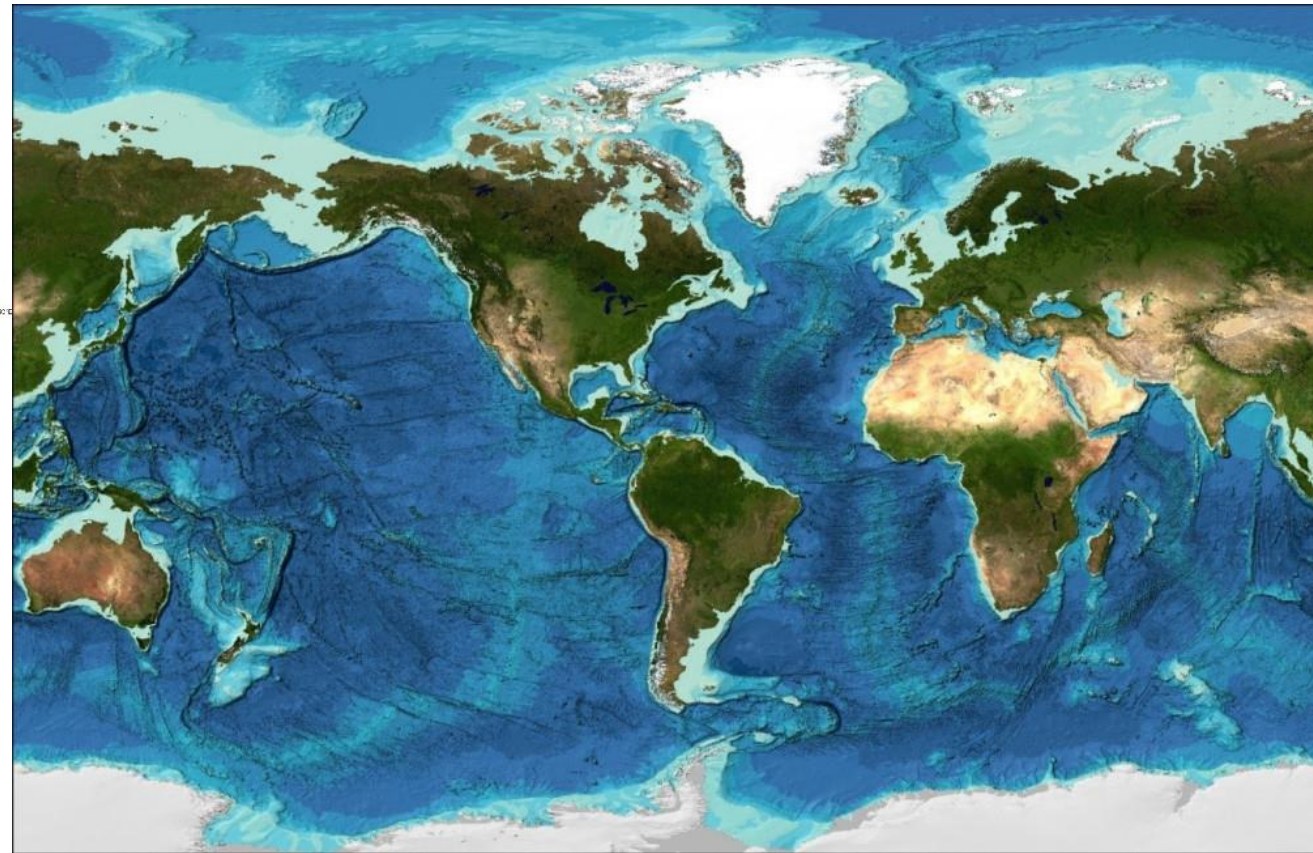
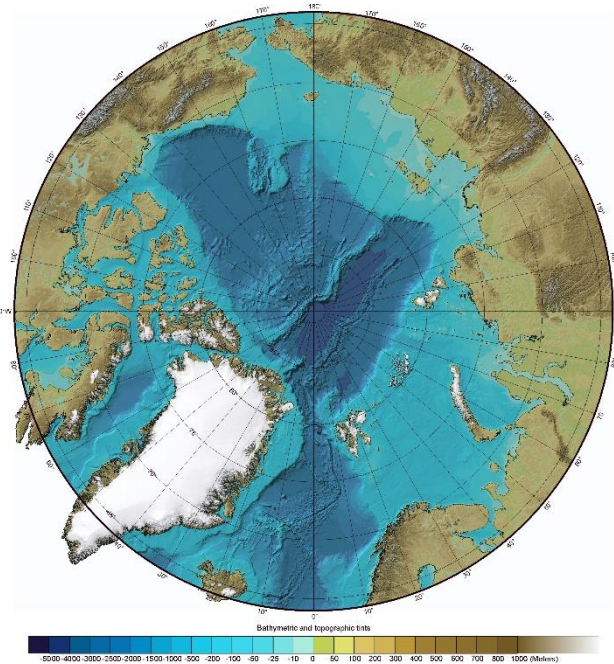


The last great mapping endeavor of our planet

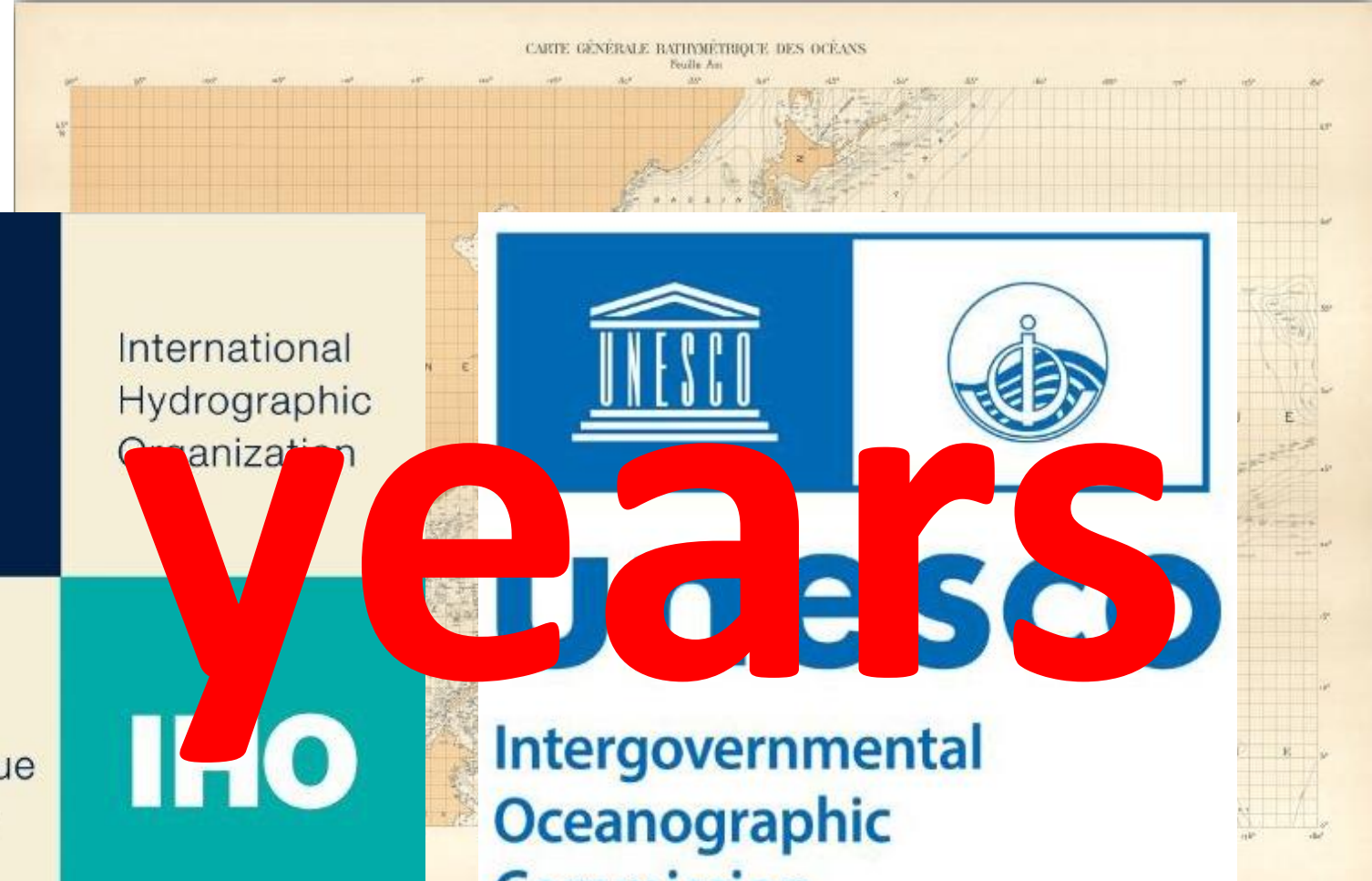
NHC66-D2
Evert Flier



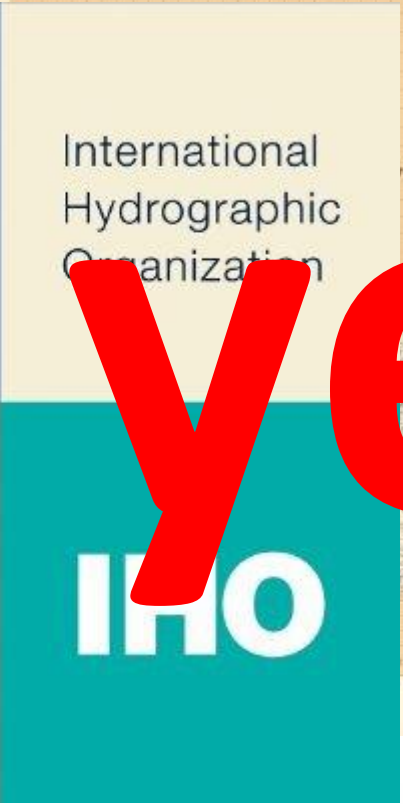
GEBCO, building partnerships for ocean mapping



GEBCO program established in 1903, first edition 1905

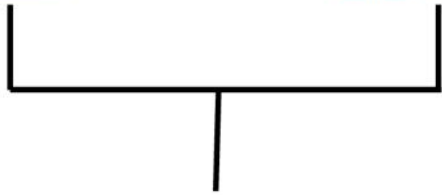


120 years

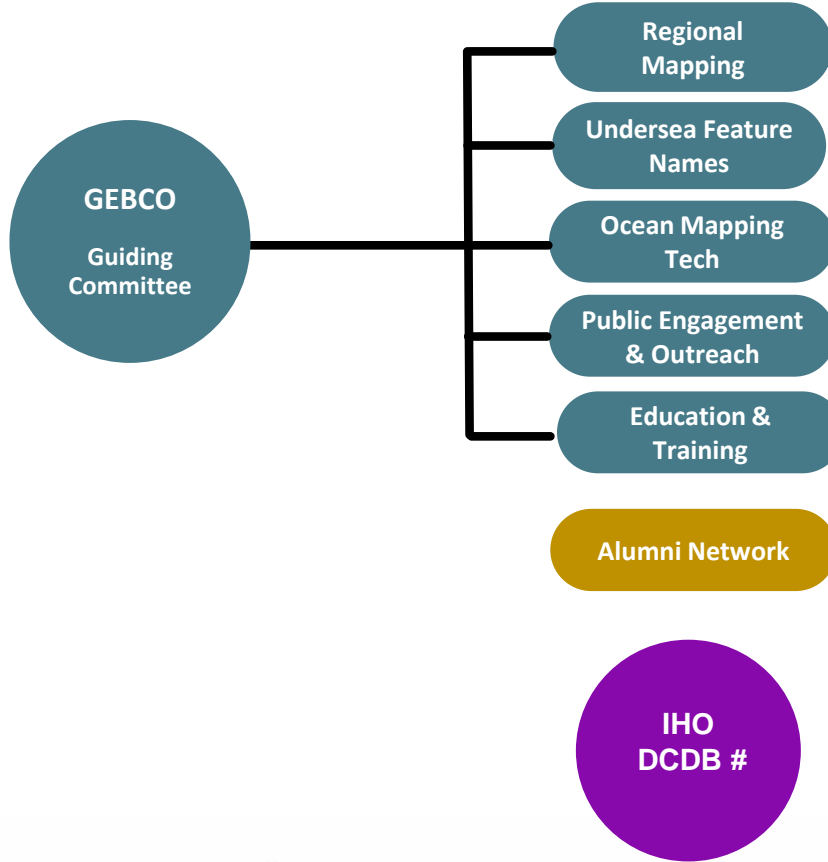




GEBCO



GEBCO Guiding Committee



GEBCO



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
- West Indian Ocean bathy data collation and compilation project



GEBCO



A detailed bathymetric map of the Western Indian Ocean region, showing the Atlantic Ocean to the west, the Indian Ocean to the east, and the African continent in the center. The map uses a color scale from light blue (shallow) to dark blue (deep) to represent ocean depths. Various tectonic features like fracture zones and basins are labeled. The map is overlaid with a semi-transparent white box containing text.

COLLATION AND COMPILATION OF MULTI-SCALE AND MULTI-RESOLUTION BATHYMETRIC DATA IN THE WESTERN INDIAN OCEAN

[WIObathy]

The Nippon Foundatio-GEBCO Alumni Conference

August 2, 2023, Tokyo Japan

Amon Kimeli

Kenya Marine and Fisheries Research Institute (KMFR)

akimeli@kmfri.go.ke



Introduction



Bathymetry data is vital in scientific research, maritime transport, military, climate and resource exploration and access



Nippon Foundation and GEBCO initiated the Seabed 2030 Project in 2018 to map the entirety of the world's ocean by 2030

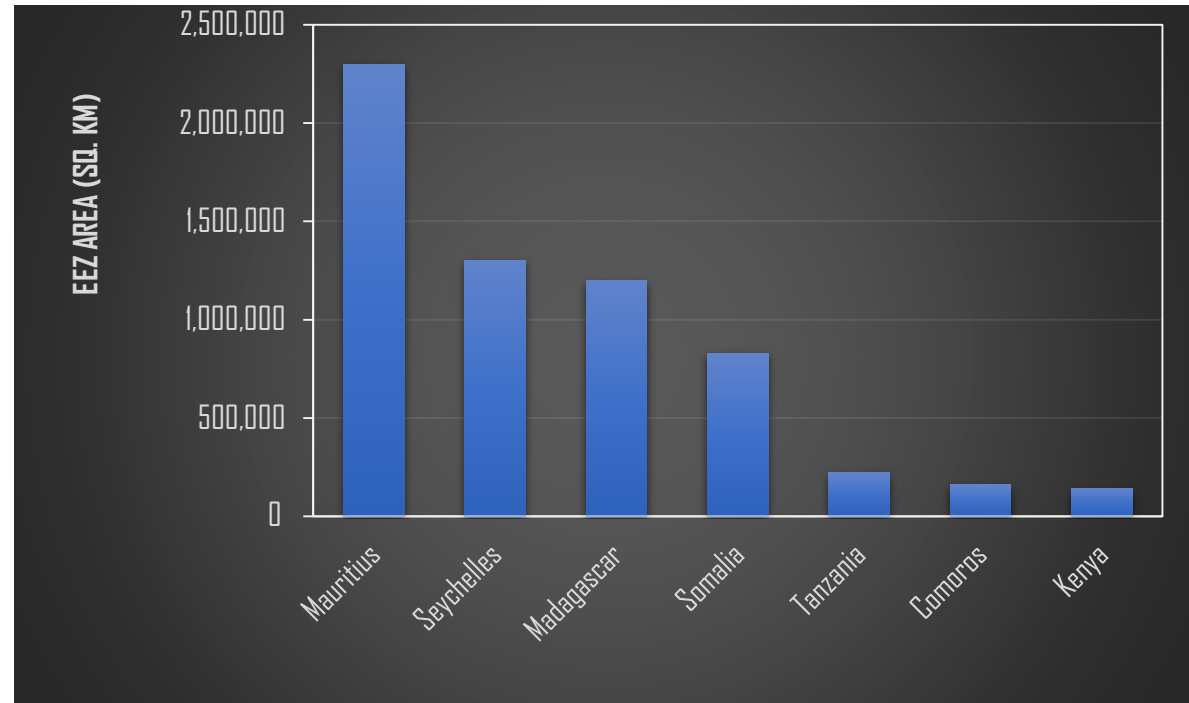
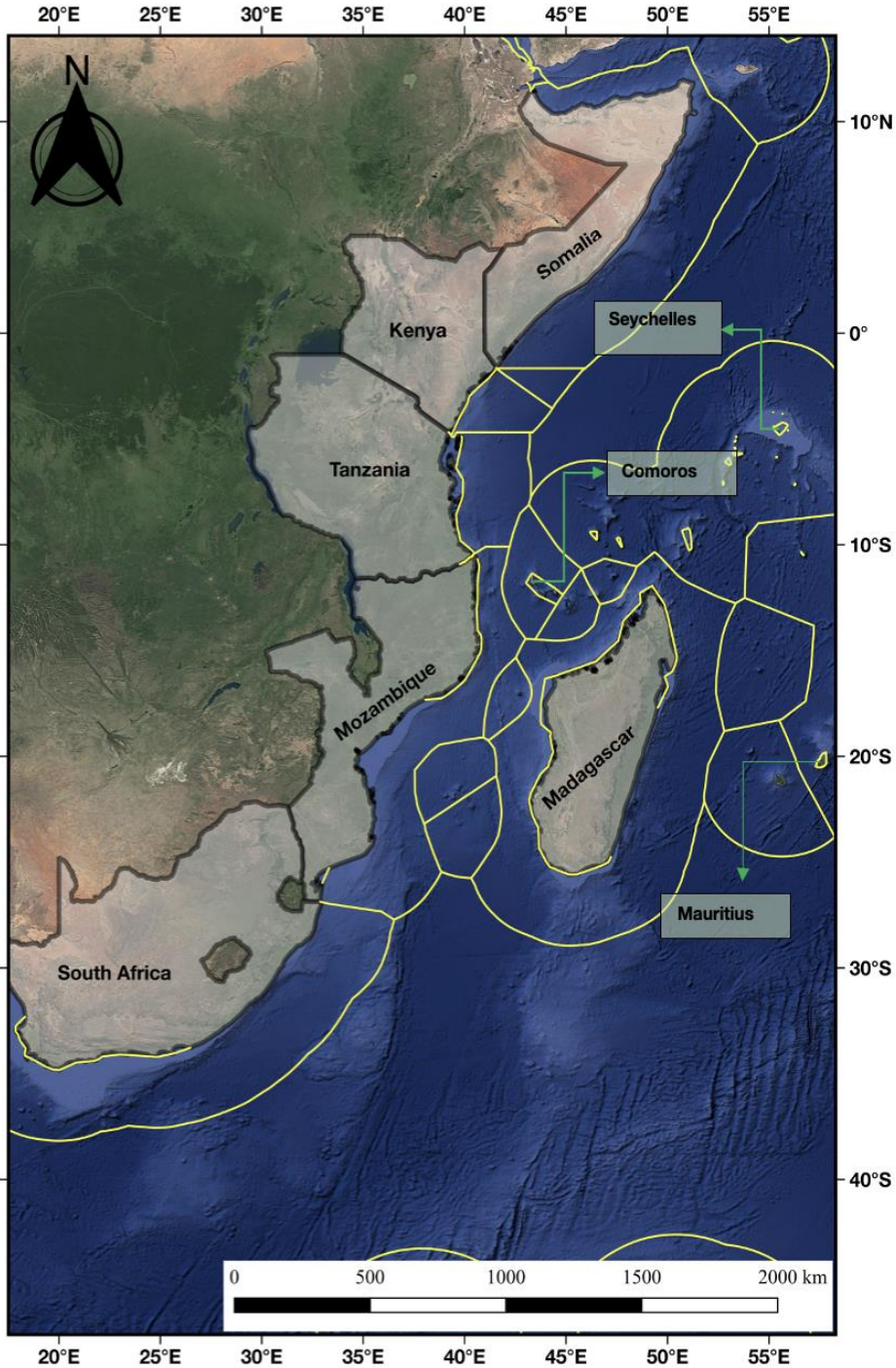


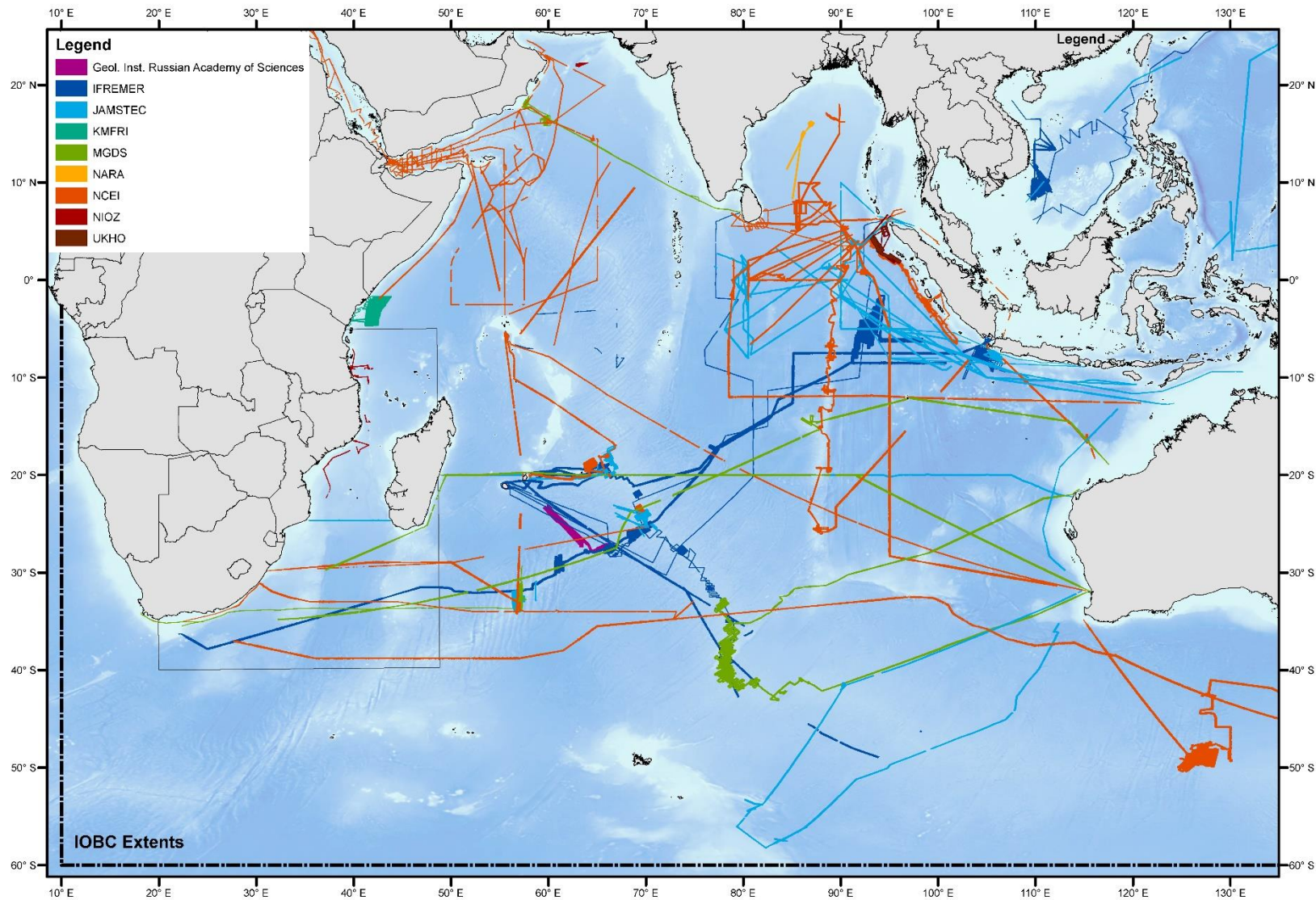
Seabed 2030 Project is endorsed as a UN decade action

- However, due to the expertise, equipment and associated costs, bathymetry data collection remains a challenge.
- It has resulted in less than a quarter of the world's ocean floor being precisely mapped
- The coverage is even dire in developing countries incl. those of the WIO

Introduction Cont'd

- Combined EEZ covering over $6.0 \times 10^6 \text{ km}^2$





Source: Wigley, 2018

- Bathymetry data has been gathered for diverse purposes, either by institutions, individual countries, or in collaboration.
- However, only a small portion of this data has been made accessible for integration into the GEBCO Grid or other open-source databases.

Area of interest

- Within EEZ
- Outside EEZ



Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
Image IBCAO

Project Objective :

To conduct a regional data mining effort to identify existing bathymetry data, consolidate it to produce the first-ever bathymetry map of the WIO region

Methodology:

1. Compile available multi-scale and multi-resolution data (SBES, MBES, LiDAR)
2. Digitize official paper charts to extract soundings (*.xyz) and contours (official navigation charts)
3. Undertake quality control (QC) as per the Seabed2030 Atlantic and Indian Regional Center workflows

Project Outputs:



First WIO region compiled bathymetry grid



Compiled and quality controlled data



Enriched GEBCO grid through addition of new data

Expanding the
scope and
collaboration

Invitation of other GEBCO Alumni from countries bordering the Indian Ocean

- Sri Lanka
- India
- Philippines
- Indonesia
- India
- Bangladesh
- Australia

THE NIPPON FOUNDATION-GEBCO

SEABED
2030

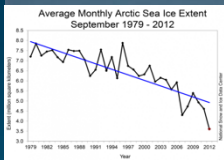
JULY 2023

SEABED 2030

Energizing Ocean Floor Mapping



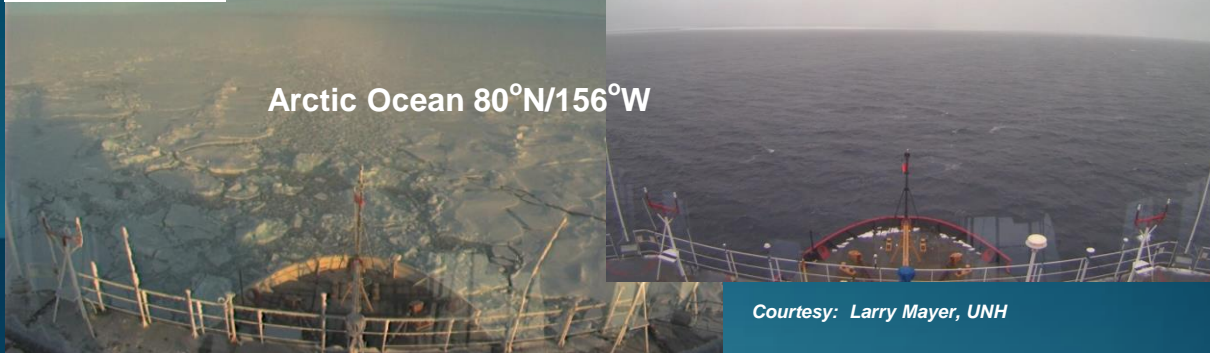
Jamie McMichael-Phillips
Seabed 2030 Director



13 September 2008

12 September 2012

Arctic Ocean 80°N/156°W



Courtesy: Larry Mayer, UNH



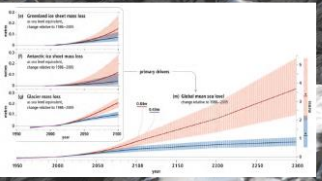
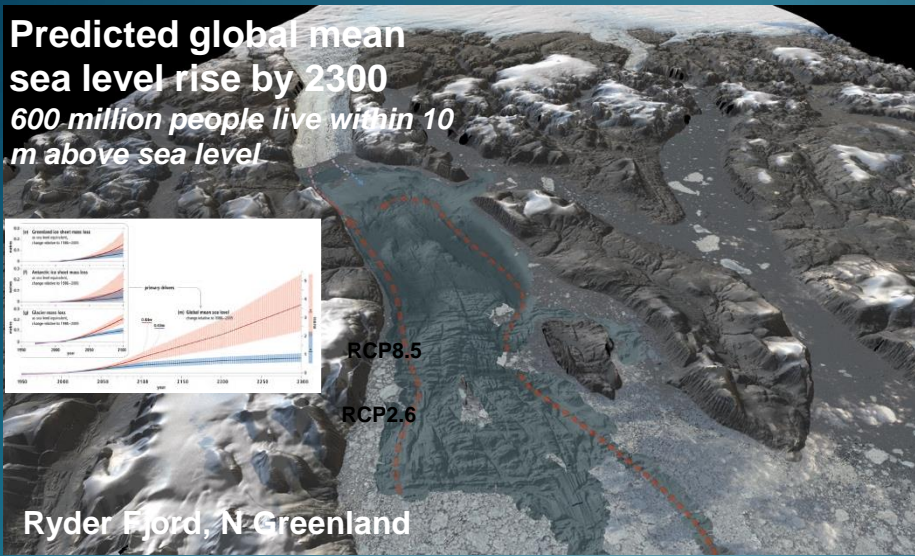
Ocean Pollution

Courtesy: Larry Mayer, UNH



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

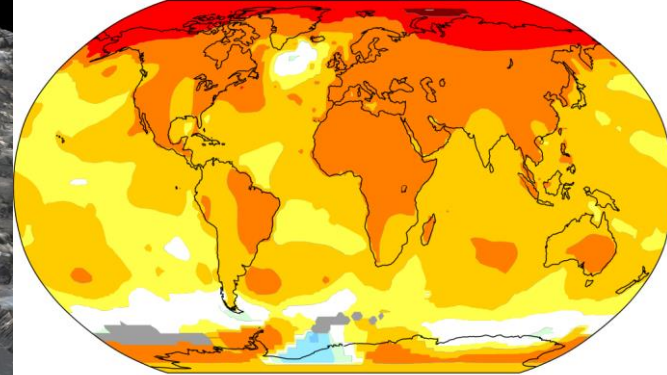
Predicted global mean sea level rise by 2300
 600 million people live within 10 m above sea level



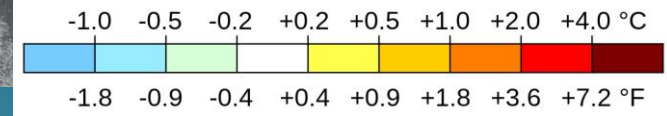
Ryder Fjord, N Greenland

Courtesy: Martin Jakobsson, SU

Temperature change in the last 50 years



2011-2021 average vs 1956-1976 baseline



Climate

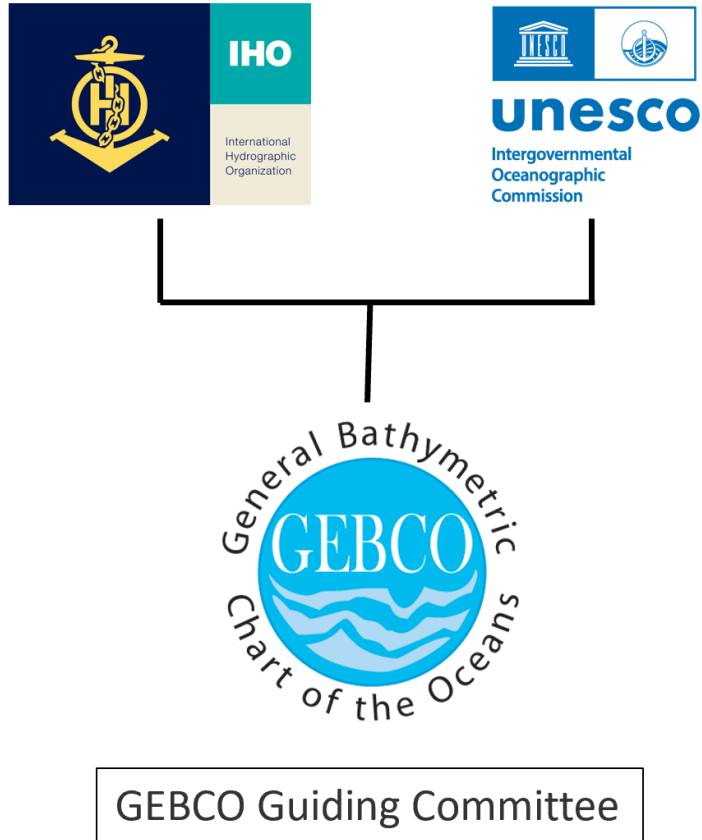
Courtesy: NASA



Alaska 1975

Courtesy: NOAA

GEBCO



Joint programme of:

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

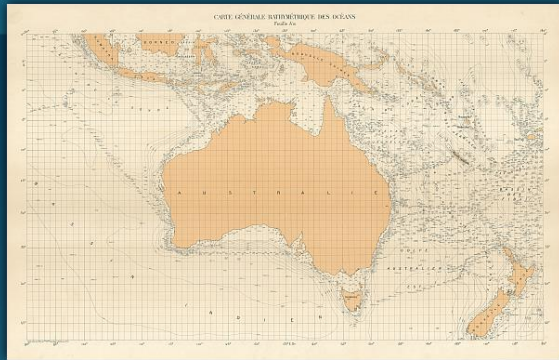
Aim: provide authoritative, publicly-available bathymetry (depth) data sets of the world's oceans

Mainly voluntary international community of:

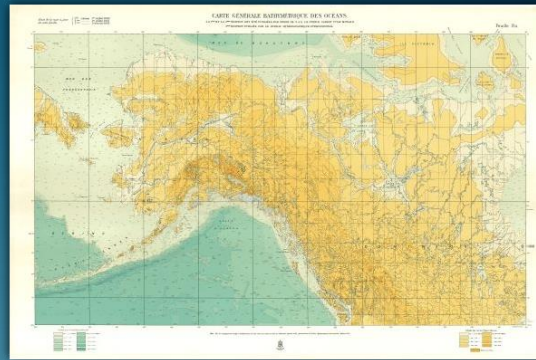
- Scientists
- Oceanographers
- Hydrographers
- Citizens

GEBCO over the decades

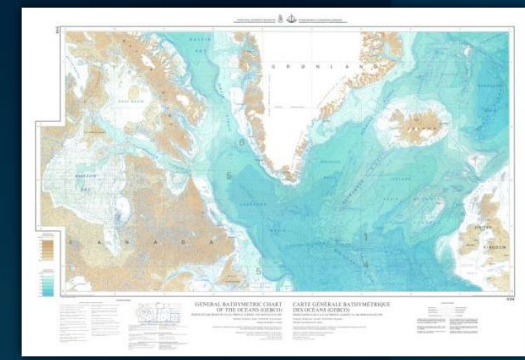
1st Edition 1903



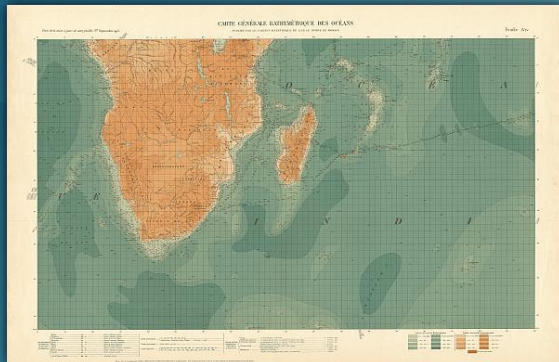
3rd Edition 1932-66



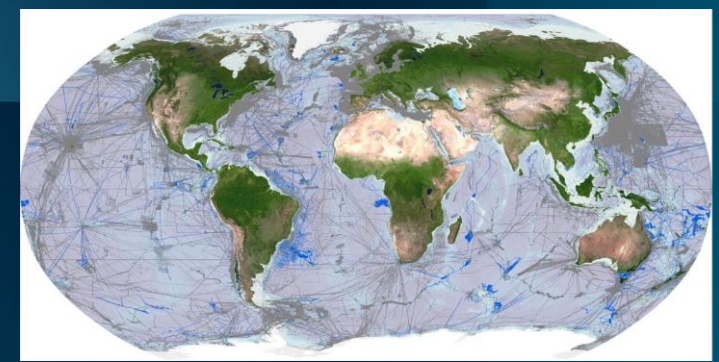
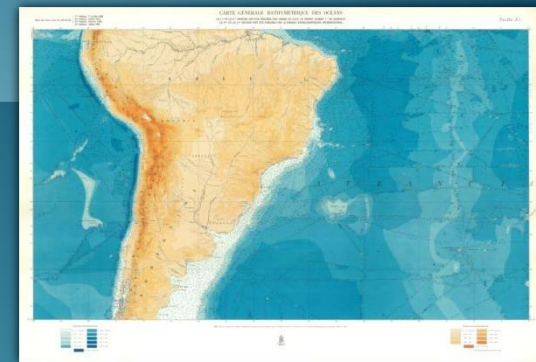
5th Edition 1973-82



2nd Edition 1910-30



4th Edition 1958-73

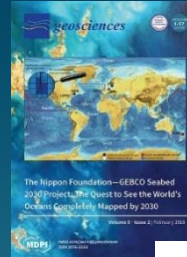


**2023
Release**

The Nippon Foundation-GEBCO Seabed 2030 Project



June 2016



June 2017



June 2021

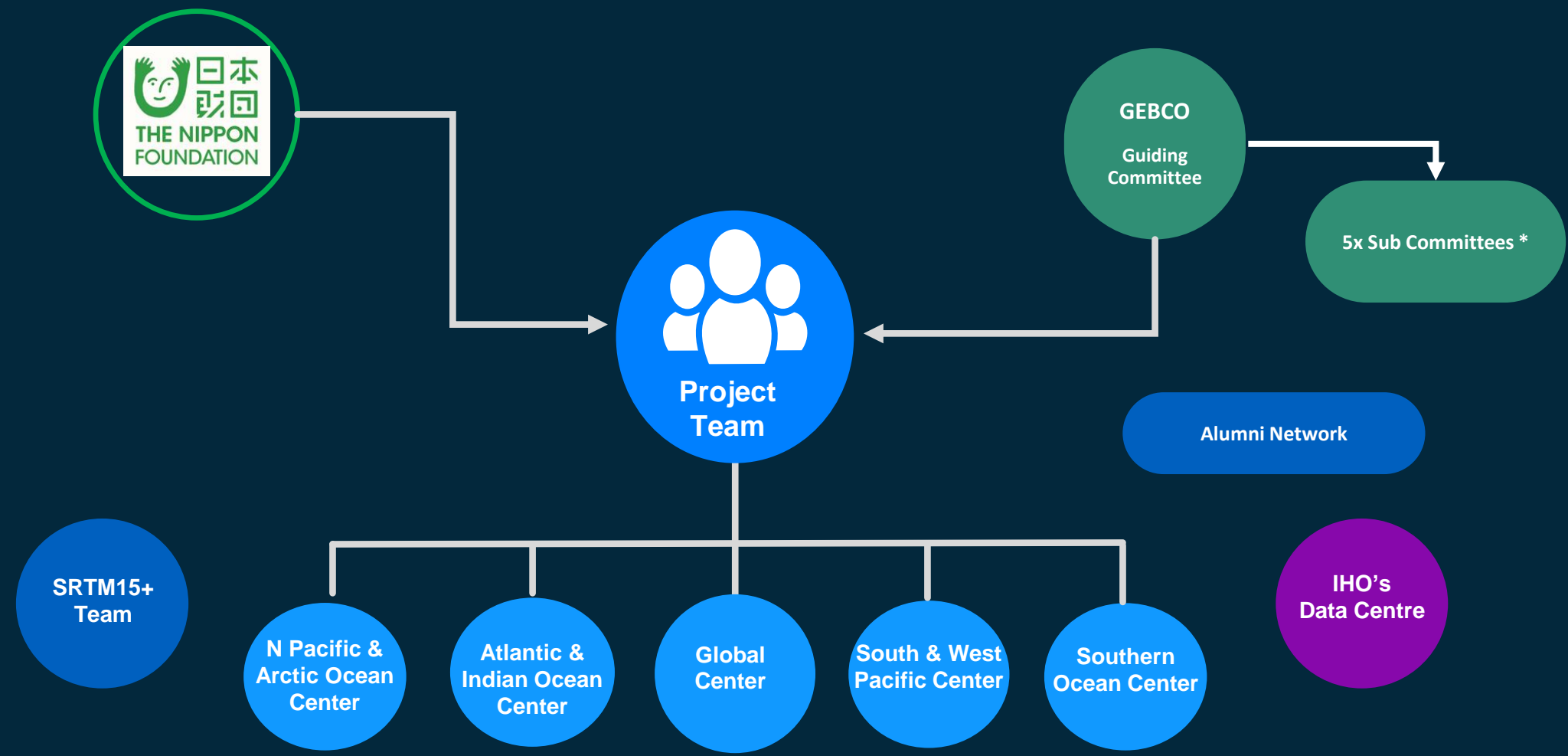


Seabed 2030 = accelerator to GEBCO's aim

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

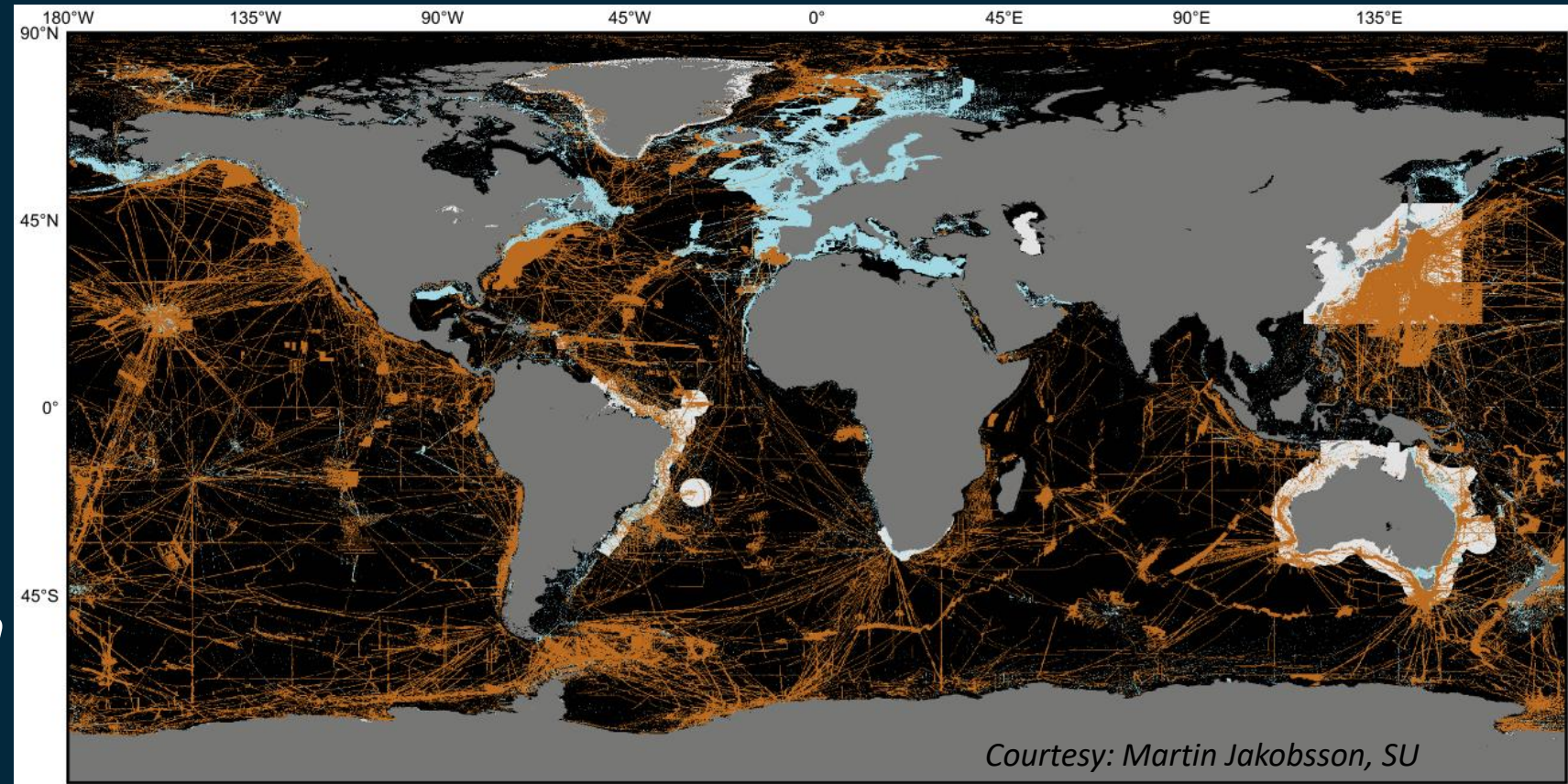
OCEAN DECADE CHALLENGES

	Pollutants	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

Progress so far ...

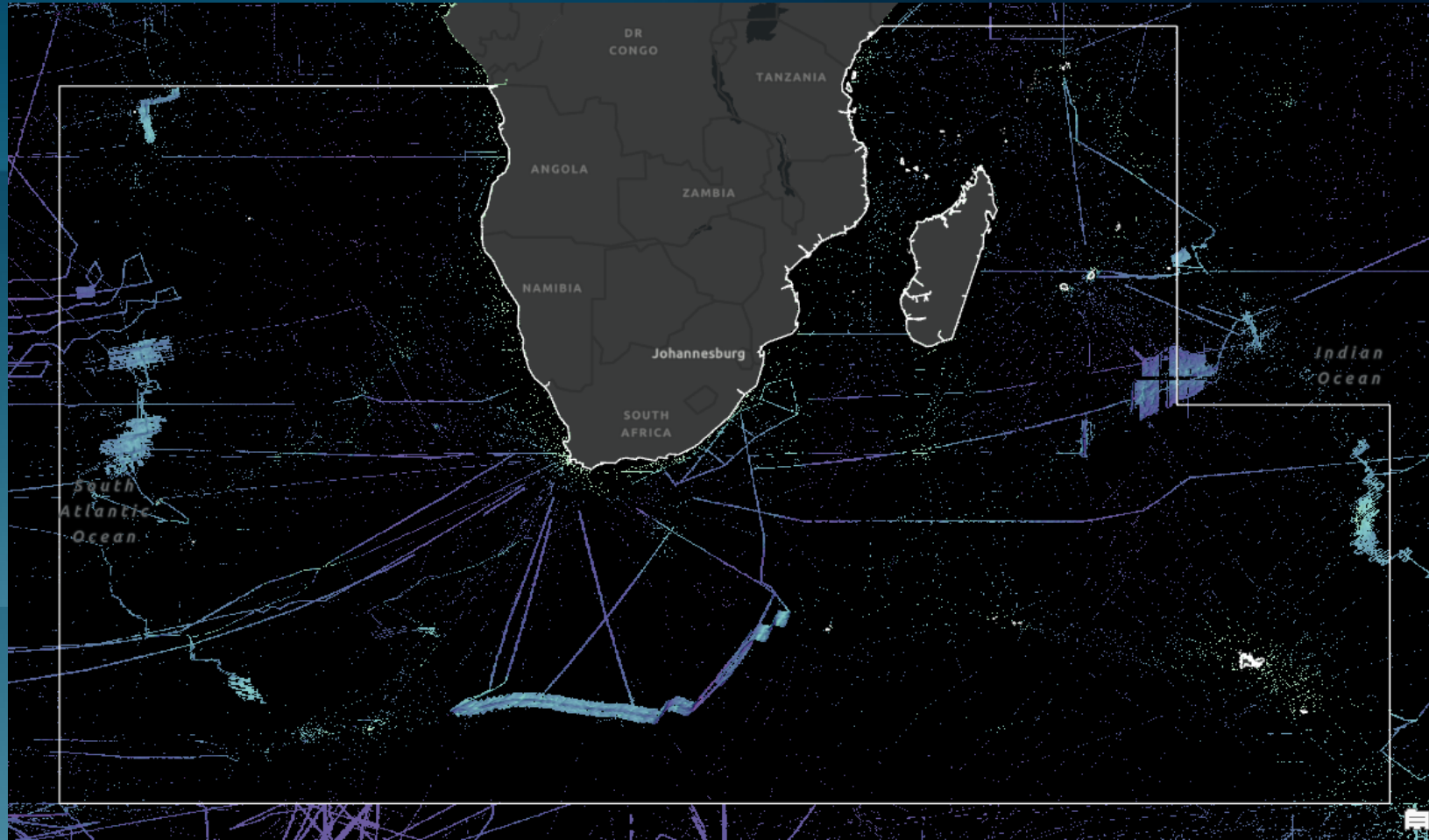
GEBCO Map:

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

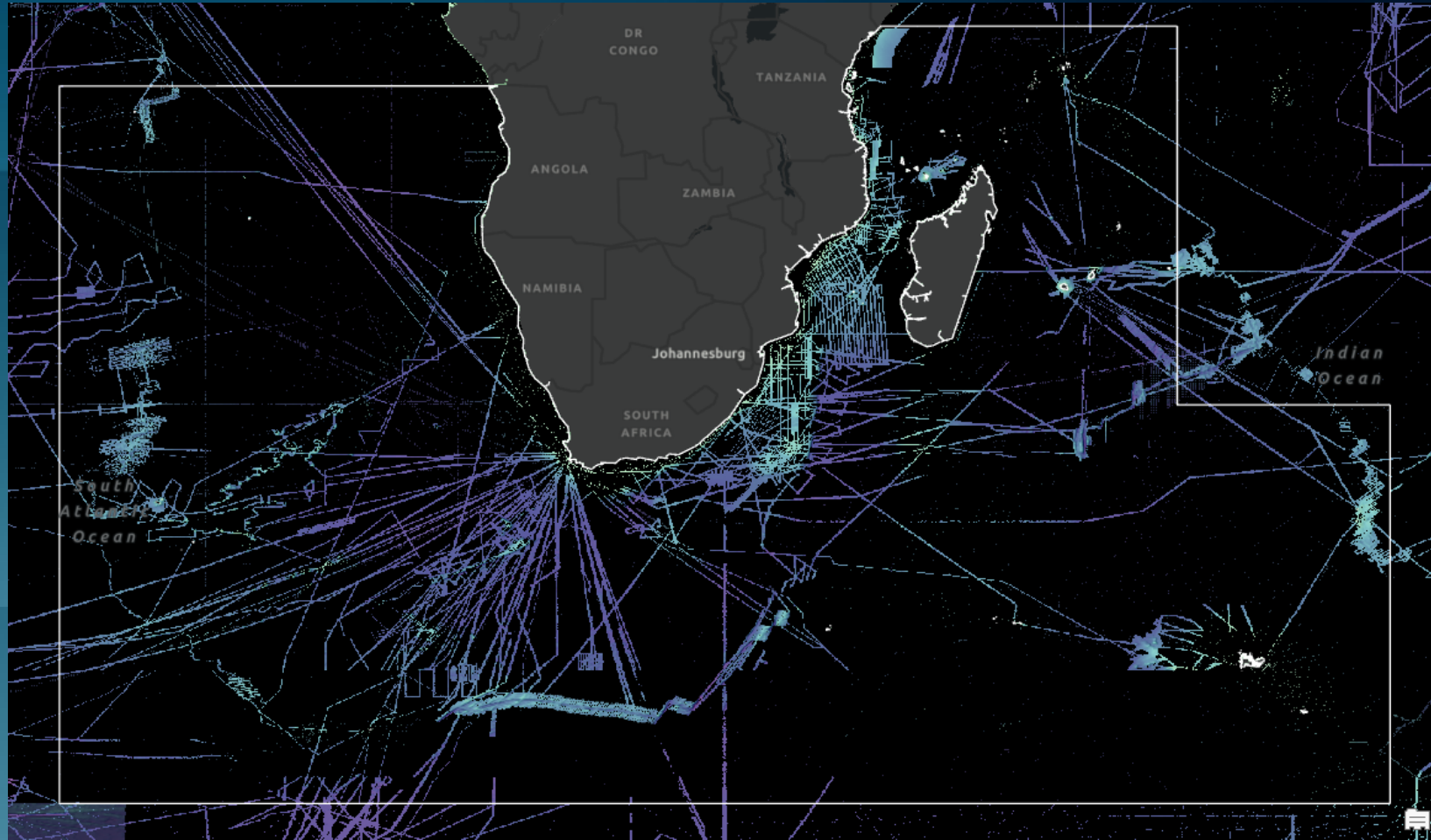


3/4 of ocean floor still to go

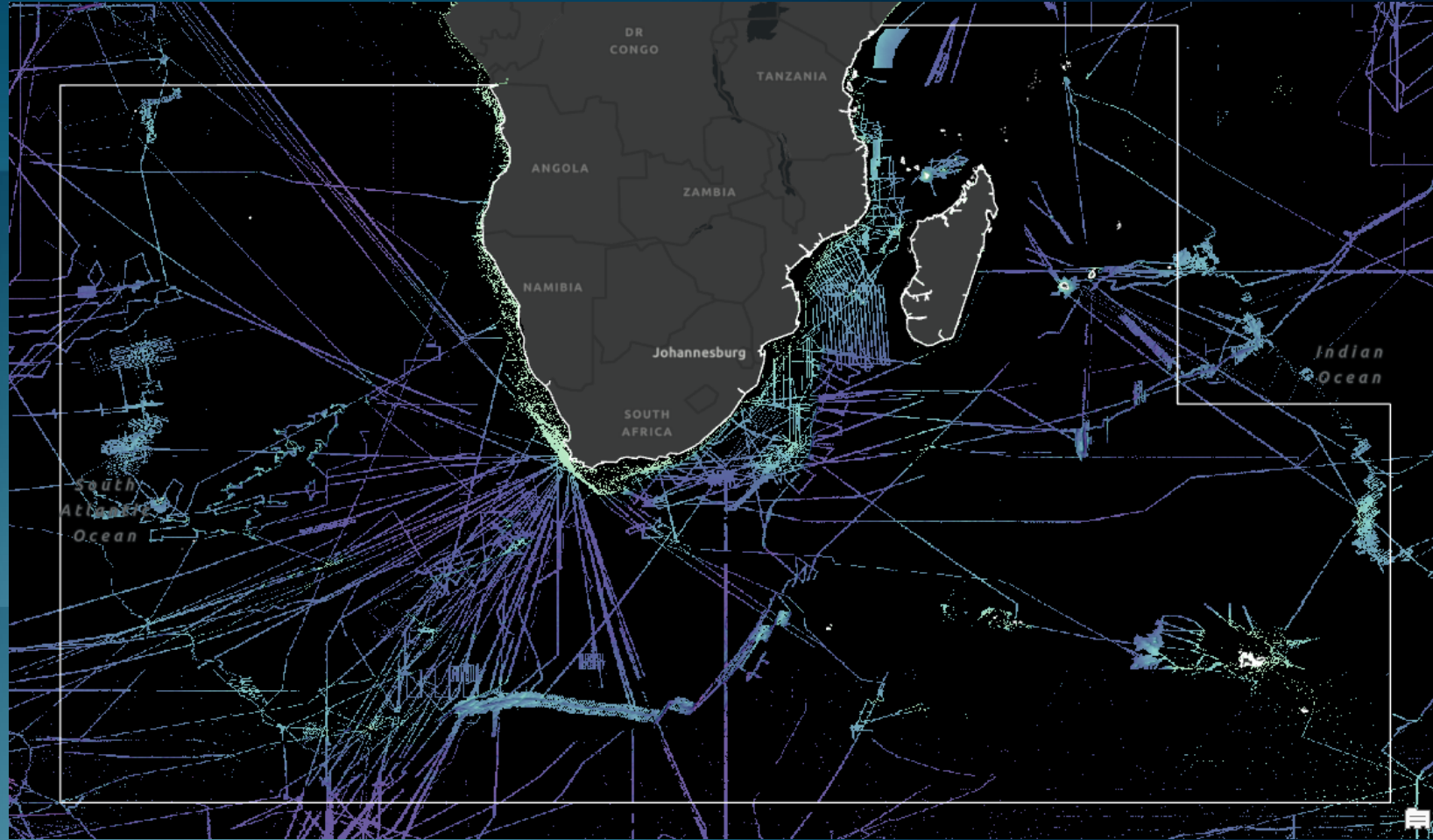
2014



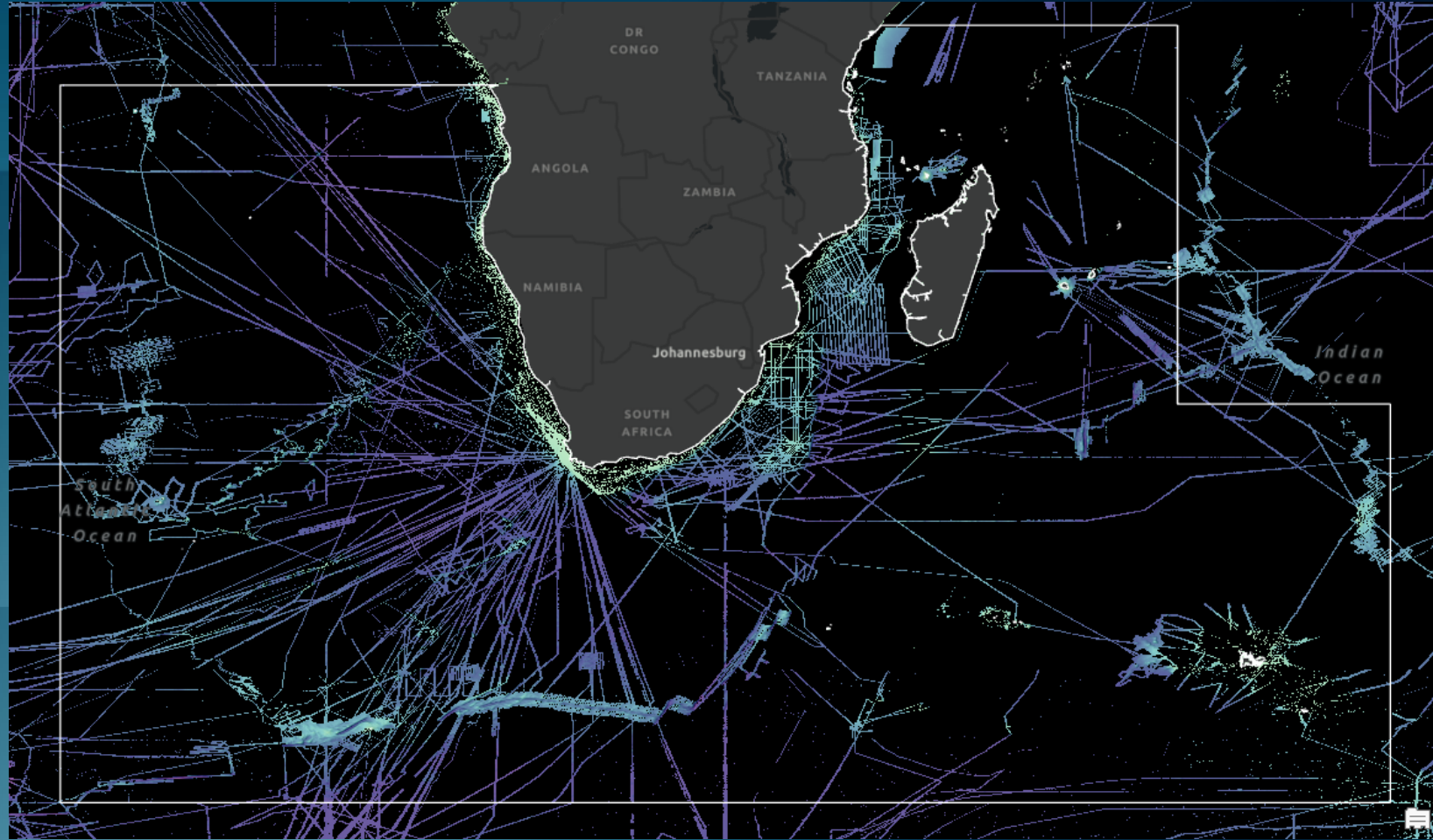
2019



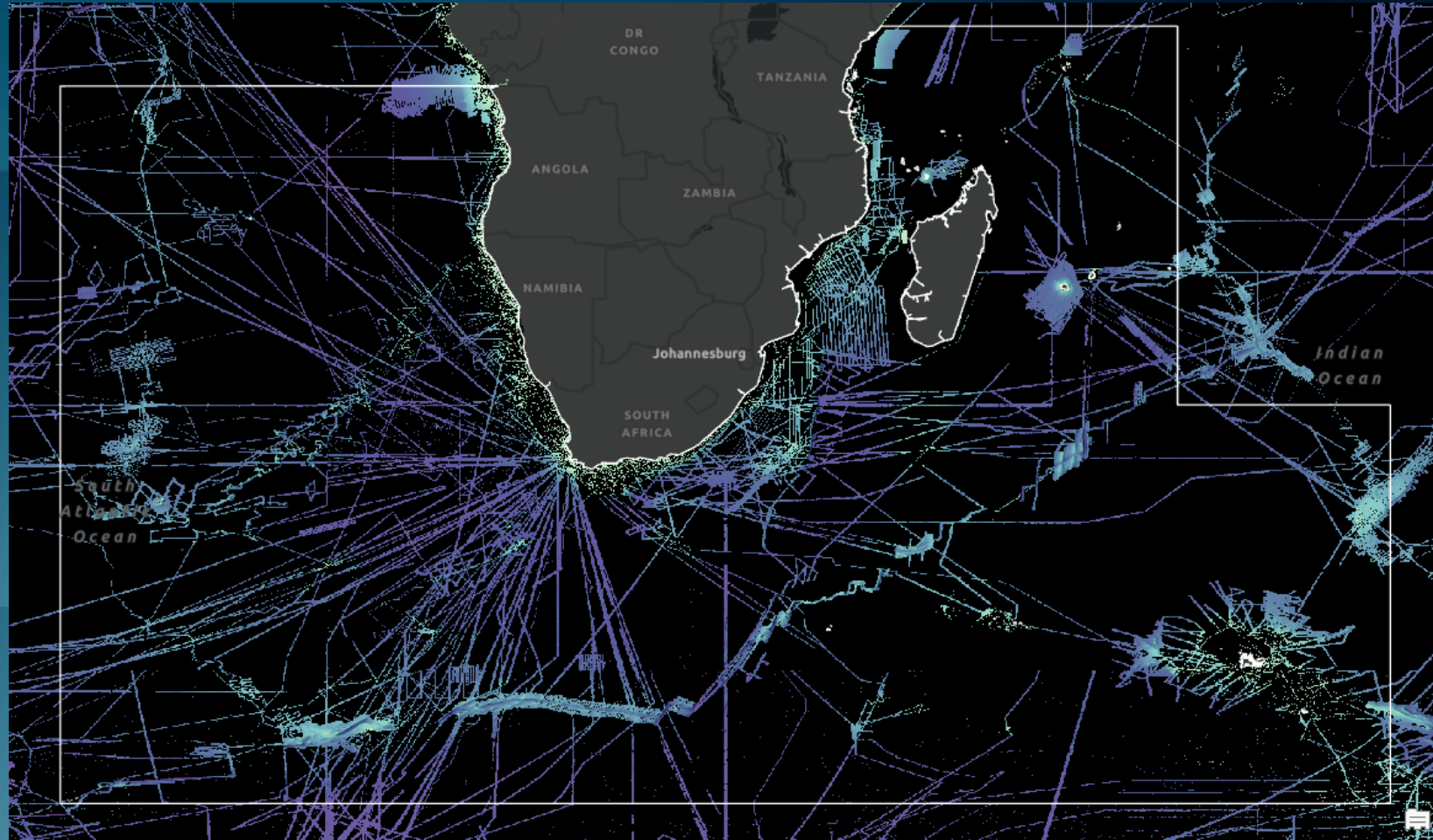
2020



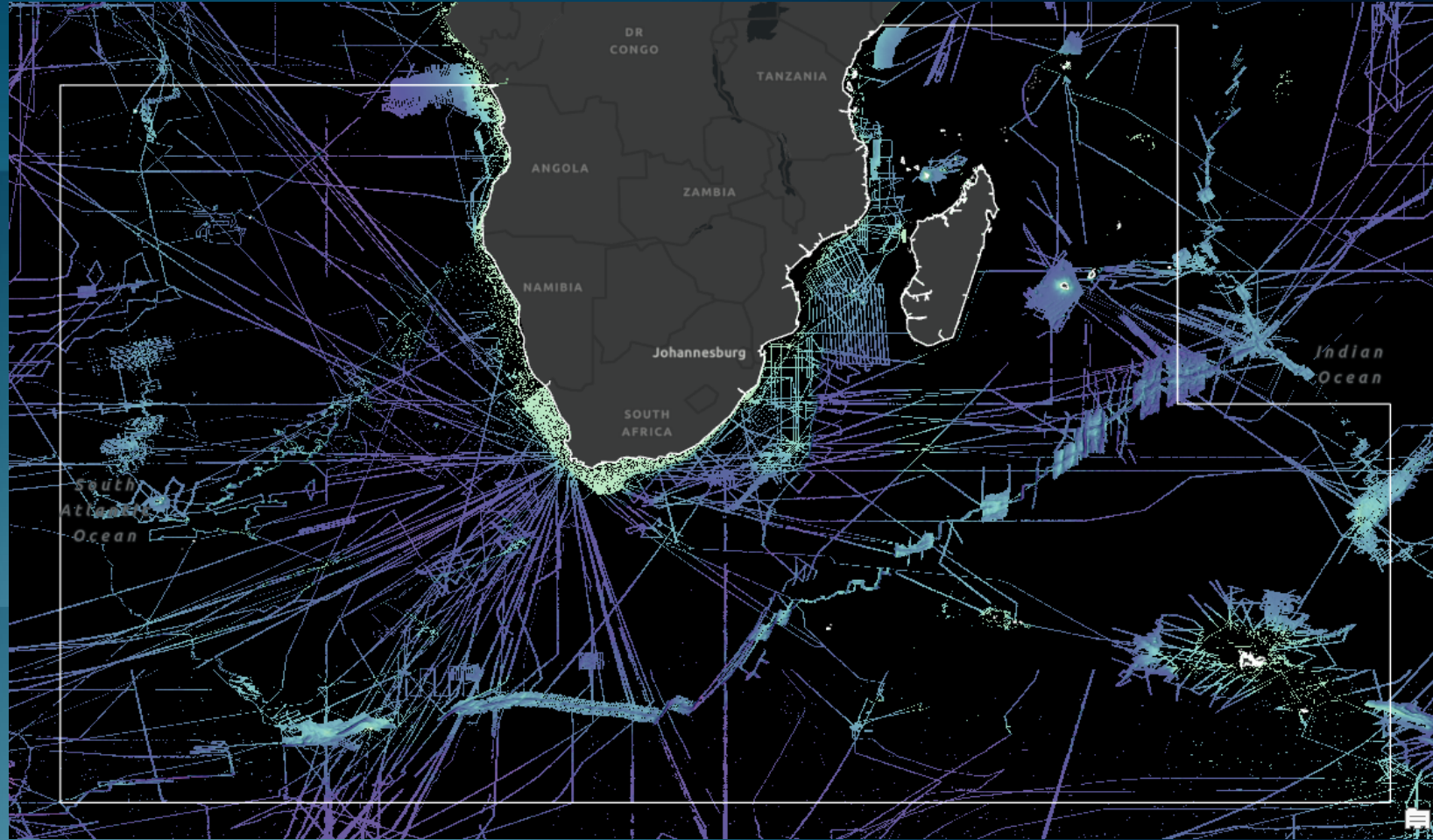
2021



2022

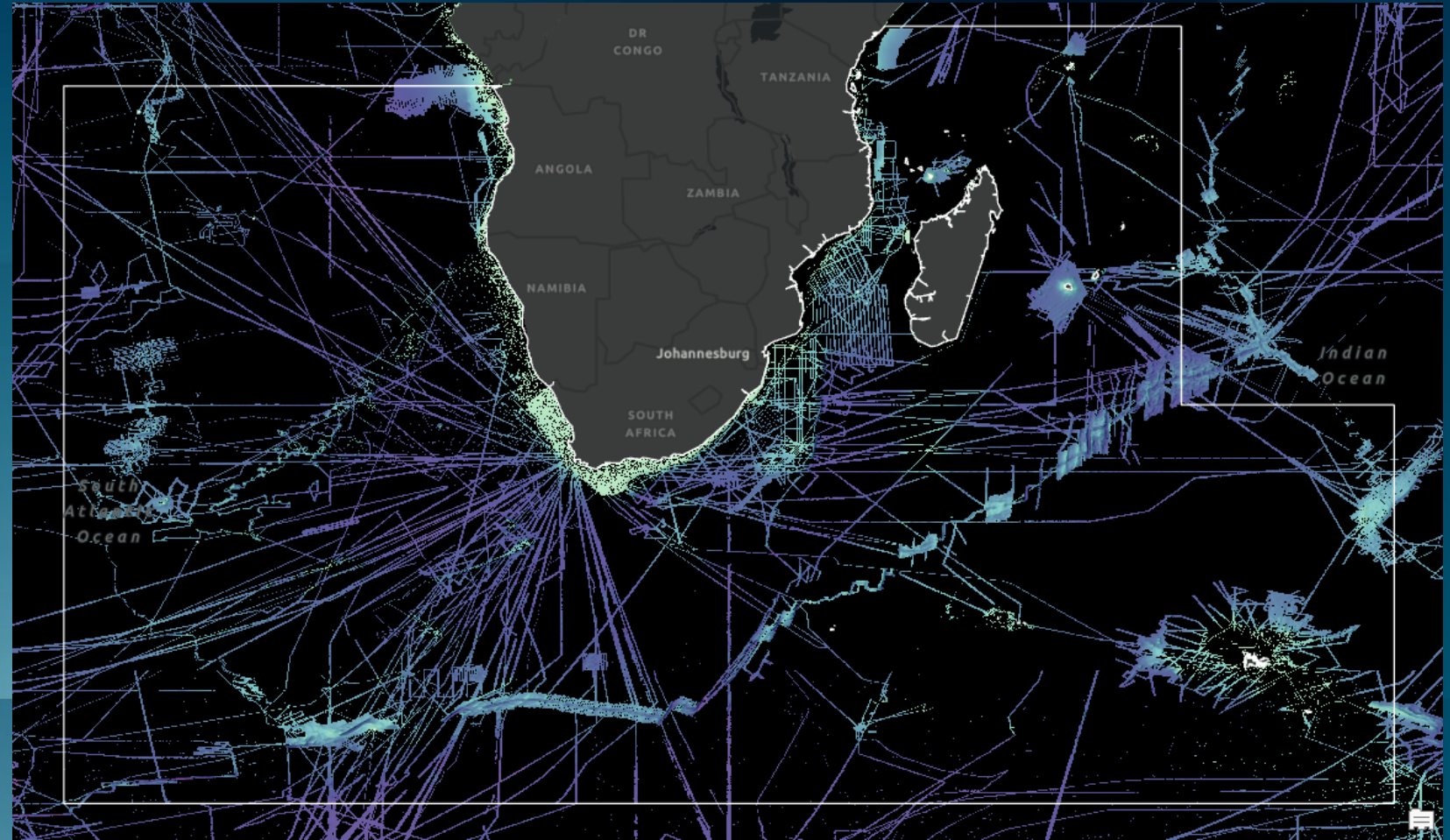


2023



DATA CONTRIBUTORS

- Australia
- France
- Germany
- Japan
- Norway
- South Africa
- Spain
- UK
- USA



SAIHC: 15.9% mapped* (GEBCO 2023)

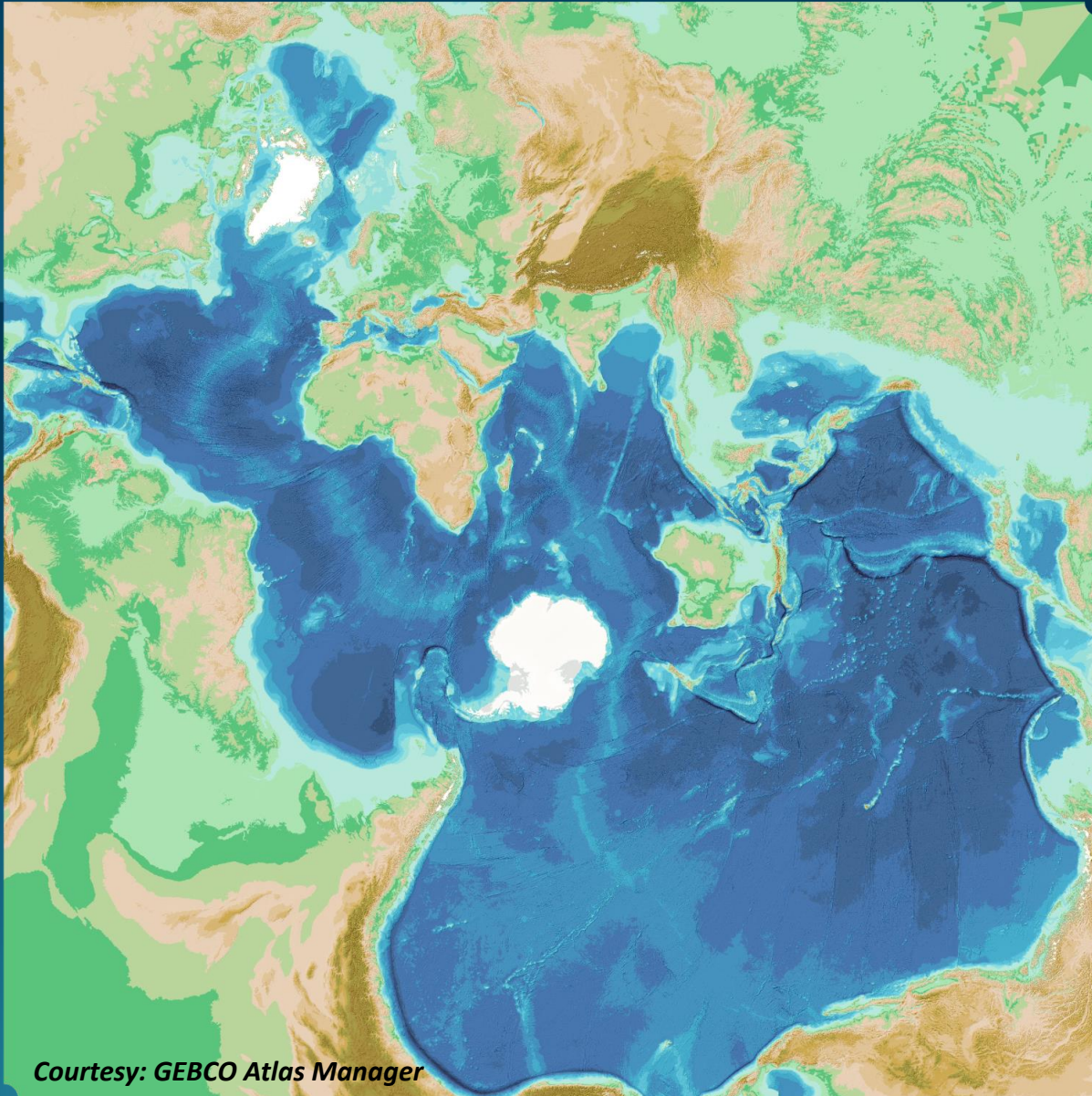
*https://www.gebco.net/about_us/committees_and_groups/scrum/mapping_project

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





Courtesy: GEBCO Atlas Manager

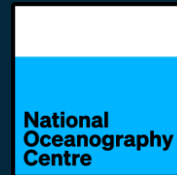
It really is

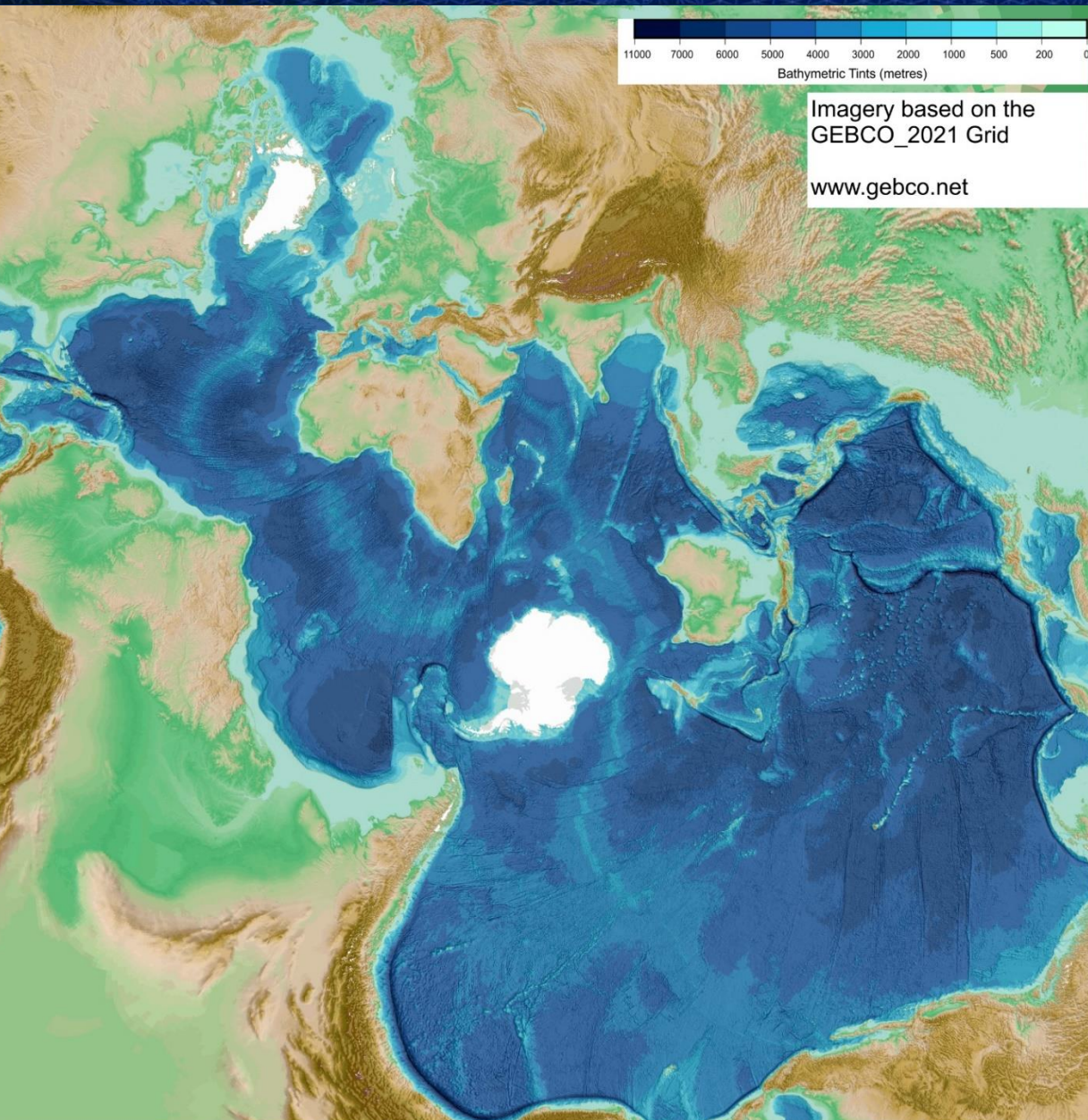
Our One Ocean!

Vision:

**100% Ocean Floor
mapped by 2030**

Thank you





GEBCO,
the foundation
of the Digital
Twin of the
Ocean