

THE NIPPON FOUNDATION-GEBCO

SEABED 2030

Why SDB matters for
Seabed Mapping

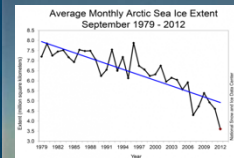
Steve Hall
Head of Partnerships



IHO

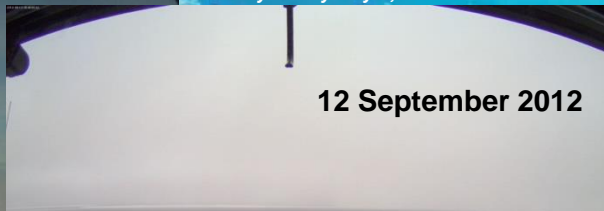
International
Hydrographic
Organization





13 September 2008

Courtesy: Larry Mayer, UNH



12 September 2012

Arctic Ocean 80°N/156°W



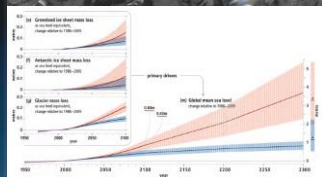
Ocean Pollution

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



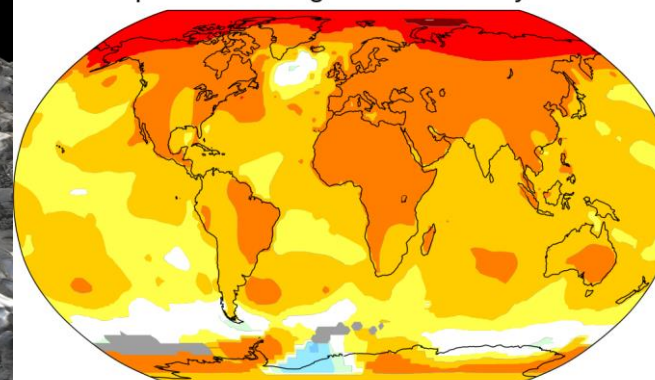
RCP8.5

RCP2.6

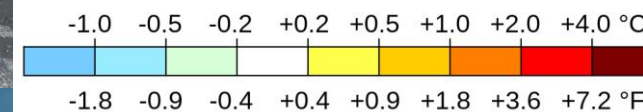
Ryder Fjord, N Greenland

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

OCEAN DECADE CHALLENGES



DECADE OUTCOMES

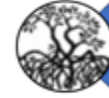
**"THE OCEAN
WE WANT"**

- 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



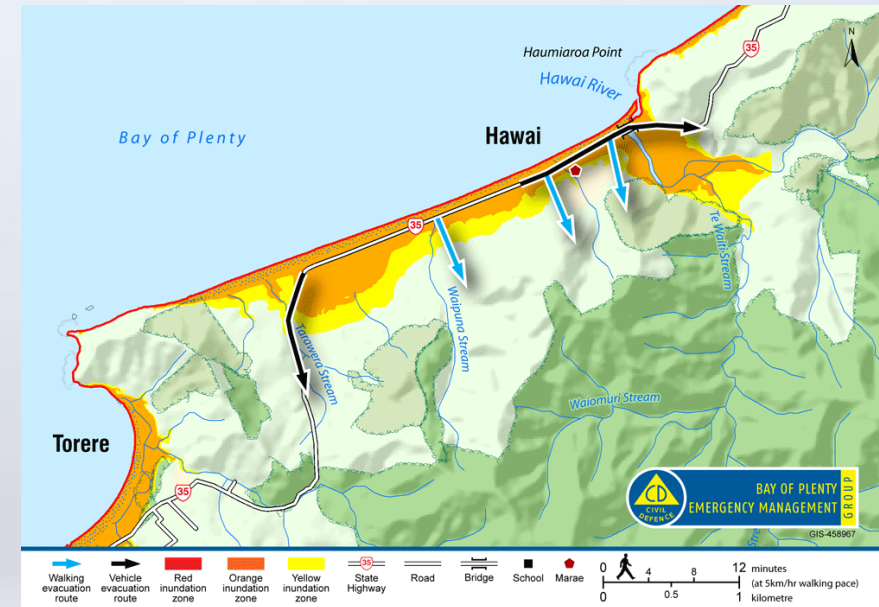
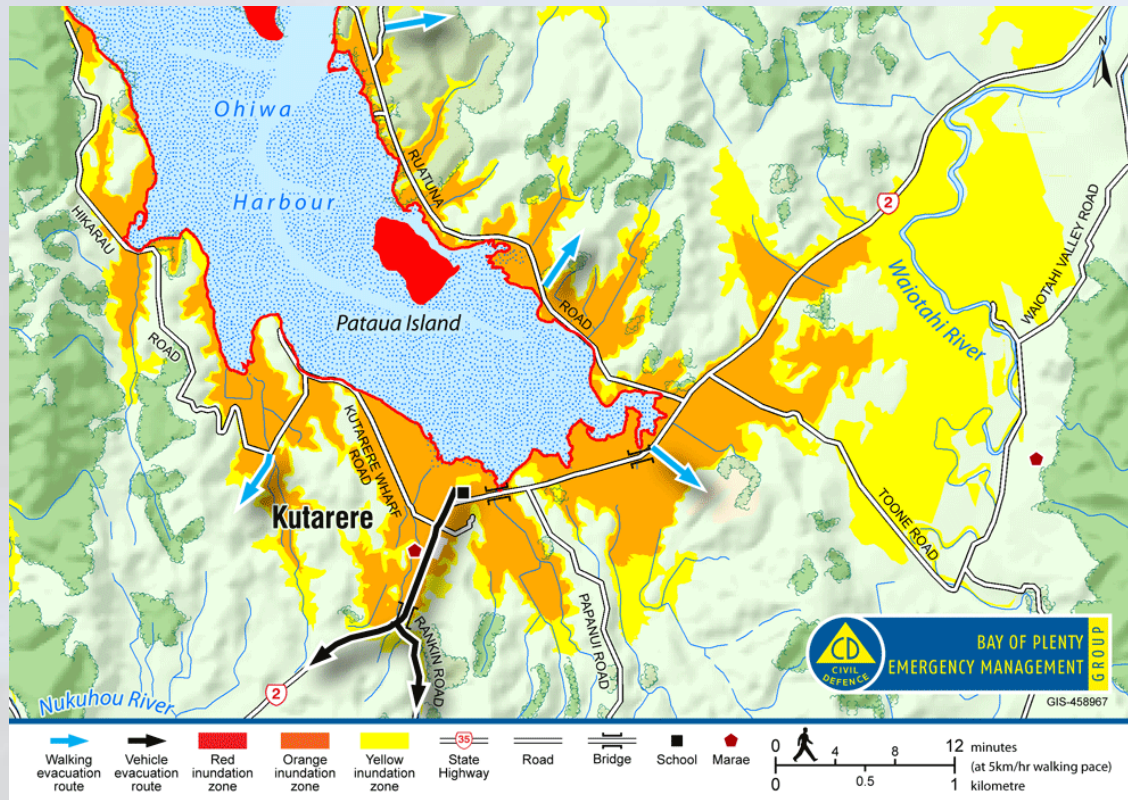
Behaviour change

Resonates with people

Tsunami Response



Knowing coastal bathymetry is essential for planning tsunami evacuation pathways

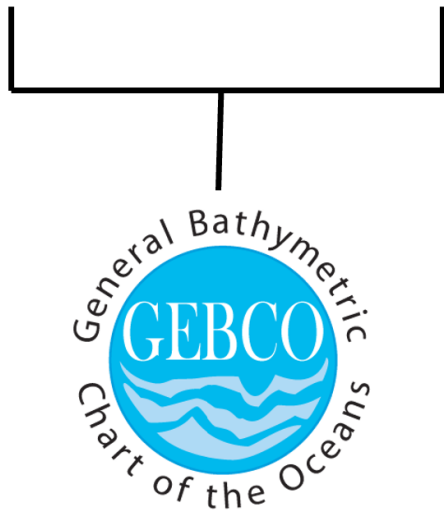


The General Bathymetric Chart of the Oceans GEBCO



**Established
1903**





GEBCO Guiding Committee

GEBCO

Today the **General Bathymetric Chart of the Oceans** is a joint programme of:

- The **International Hydrographic Organization**
- &
- The **Intergovernmental Oceanographic Commission**

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

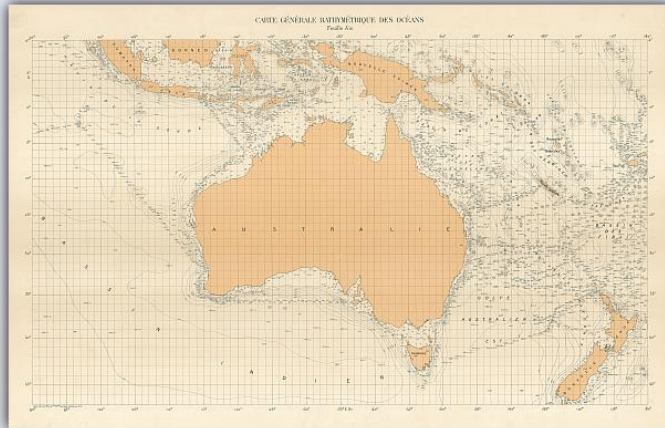
The GEBCO community is largely a voluntary force of international scientists and hydrographers

Seabed 2030 is an “accelerator” to fast-track GEBCO’s aim

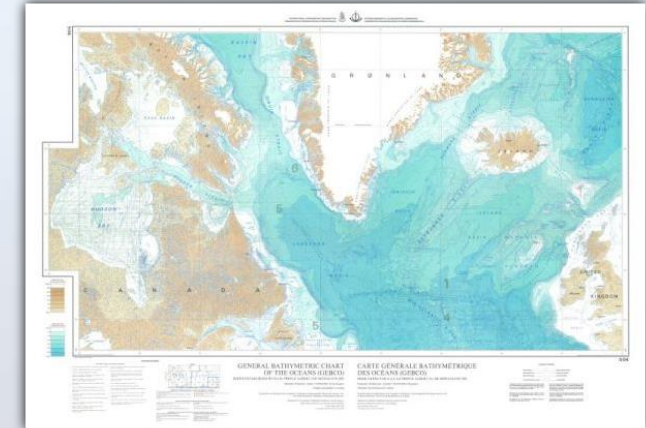
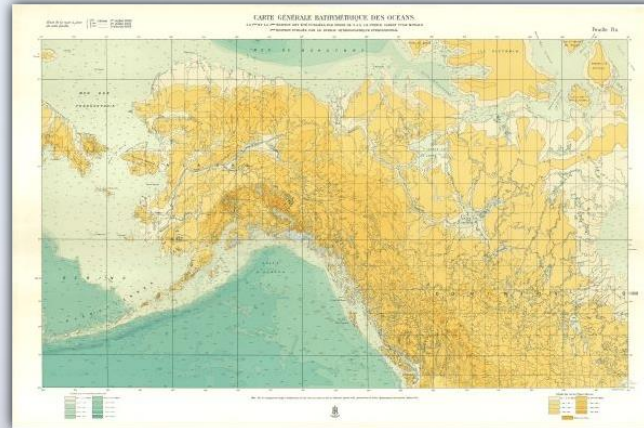


GEBCO over the decades

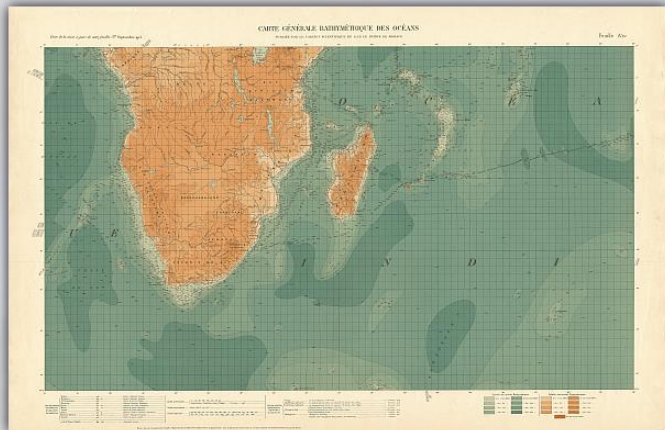
1st Edition 1903



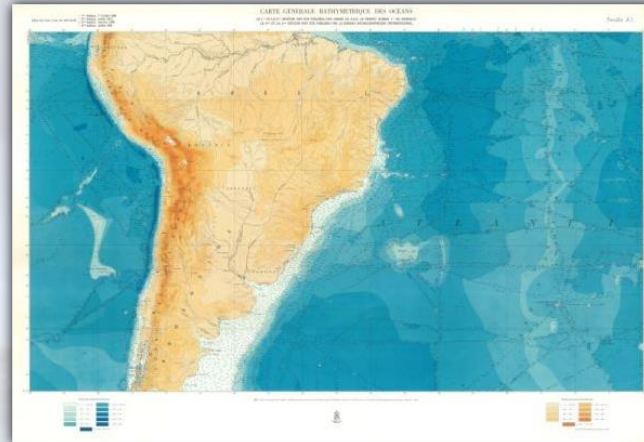
3rd Edition 1932-66



5th Edition 1973-82

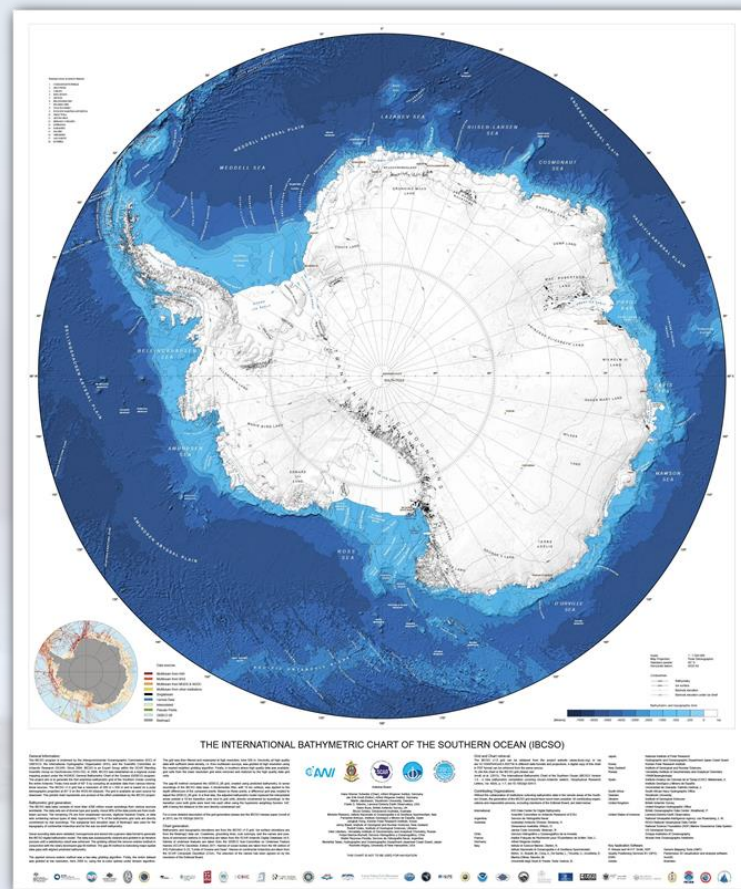


2nd Edition 1910-30



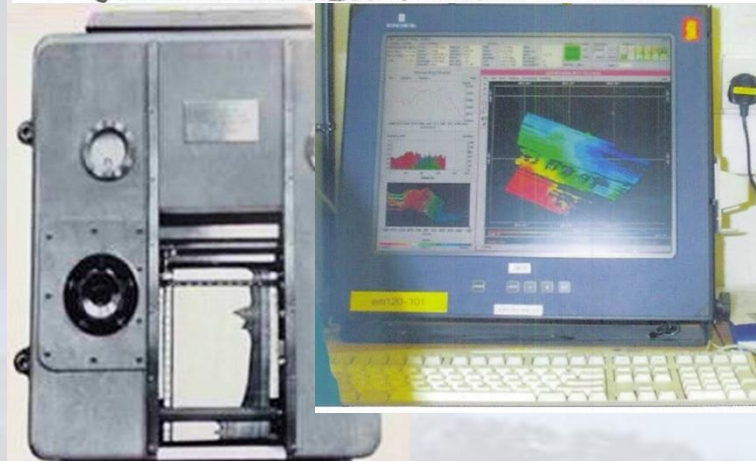
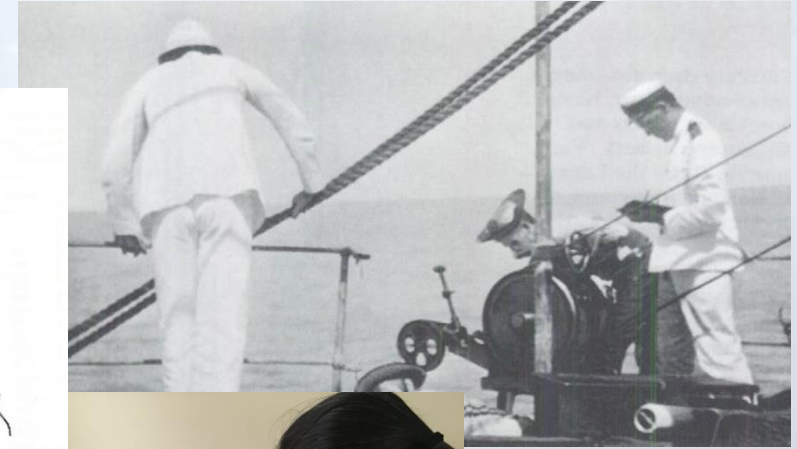
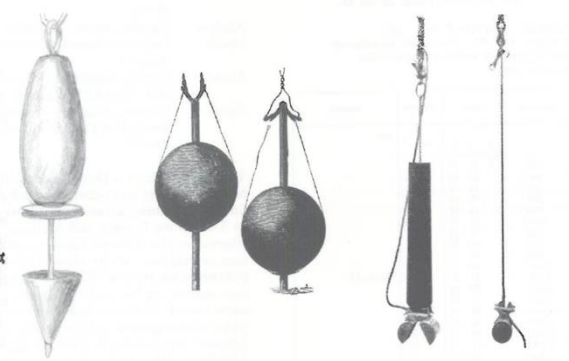
4th Edition 1958-73

New GEBCO products are digital charts based on the GEBCO grid at 15 arc seconds resolution.



THE NIPPON FOUNDATION-GEBCO
SEABED
2030

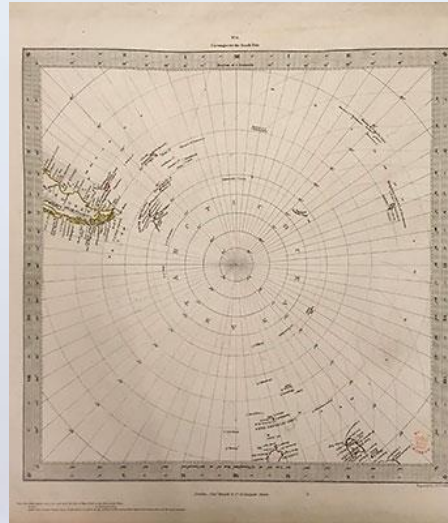
Gathering Bathymetry



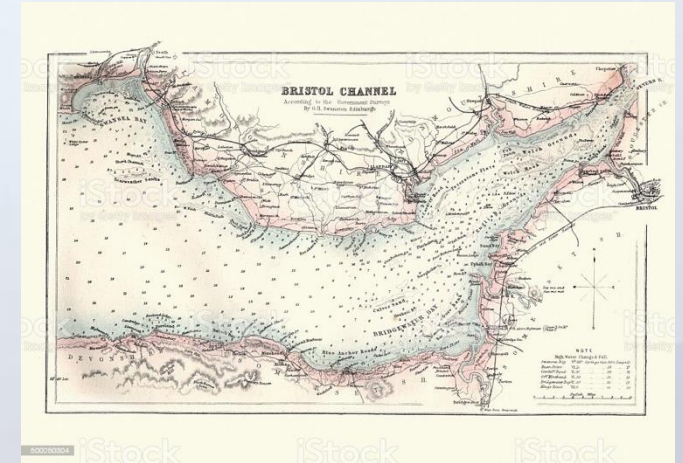
Gaps to be filled – it's taking a while!



James Cook, 1770

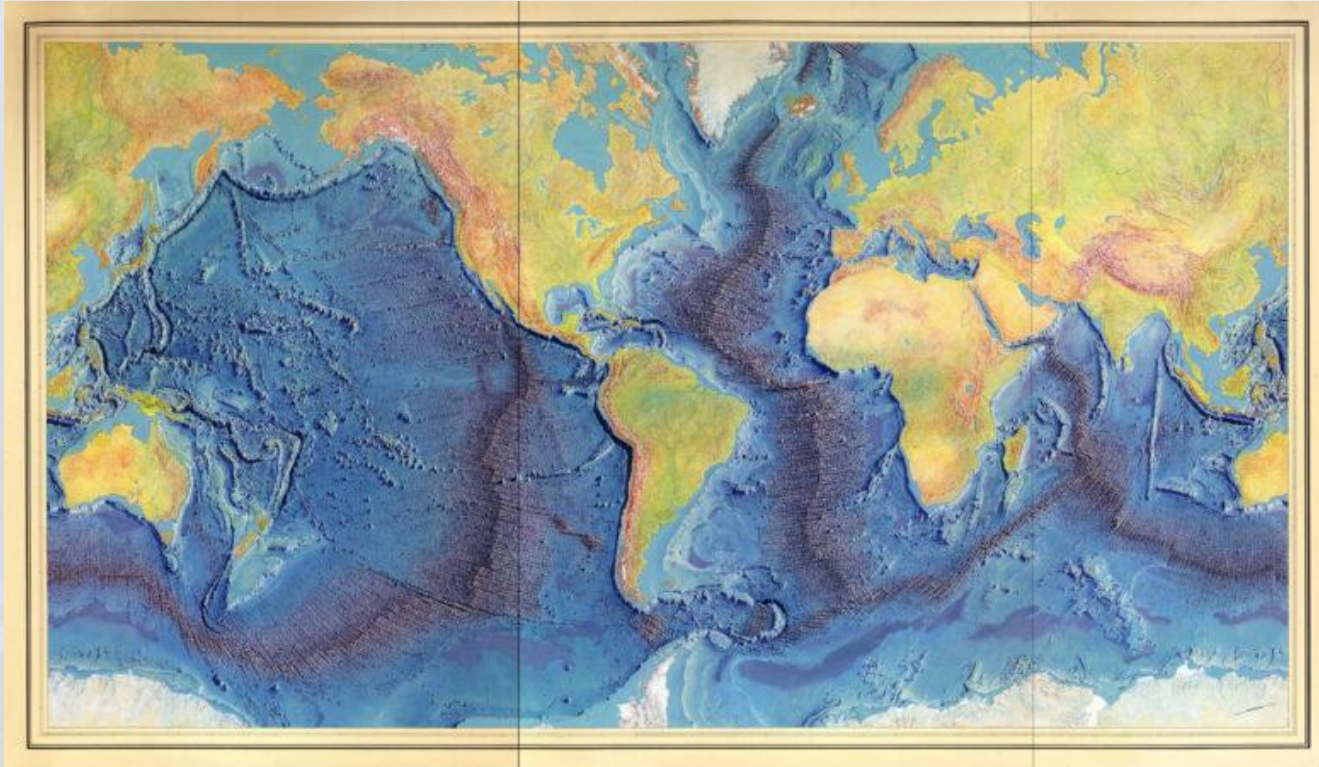


Edward Bransfield, 1820 observation on 1844 chart

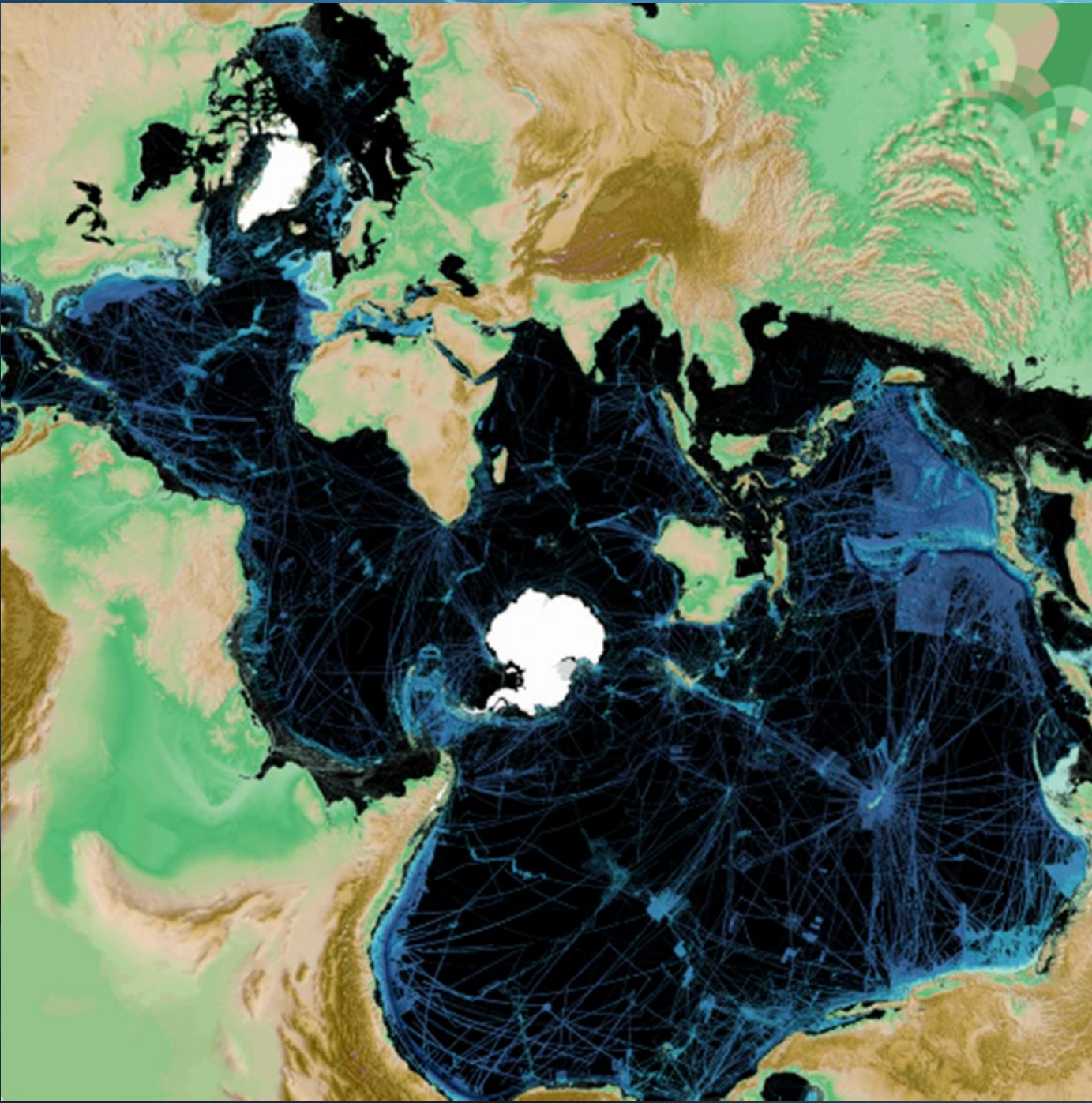


Bristol Channel, 1880

Sometimes it's art and science..



Classic Marie Tharp & Bruce Heezen,
1977 version



It really is

Our One Ocean!

Seabed 2030 Vision:

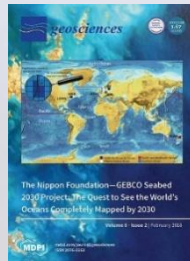
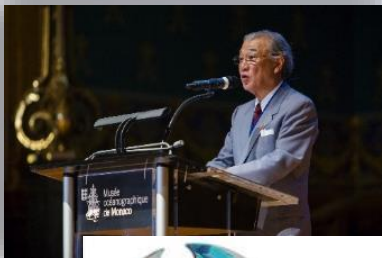
**100% of our Ocean Floor
mapped by 2030**



Seabed 2030

Collaborative project between The Nippon Foundation and GEBCO to inspire complete mapping of the world's ocean by 2030 and to compile all bathymetric (depth) data into the freely-available GEBCO Ocean Map.

Seabed 2030 is an “accelerator” to fast-track GEBCO’s aim



Endorsed Decade Programme

June 2016

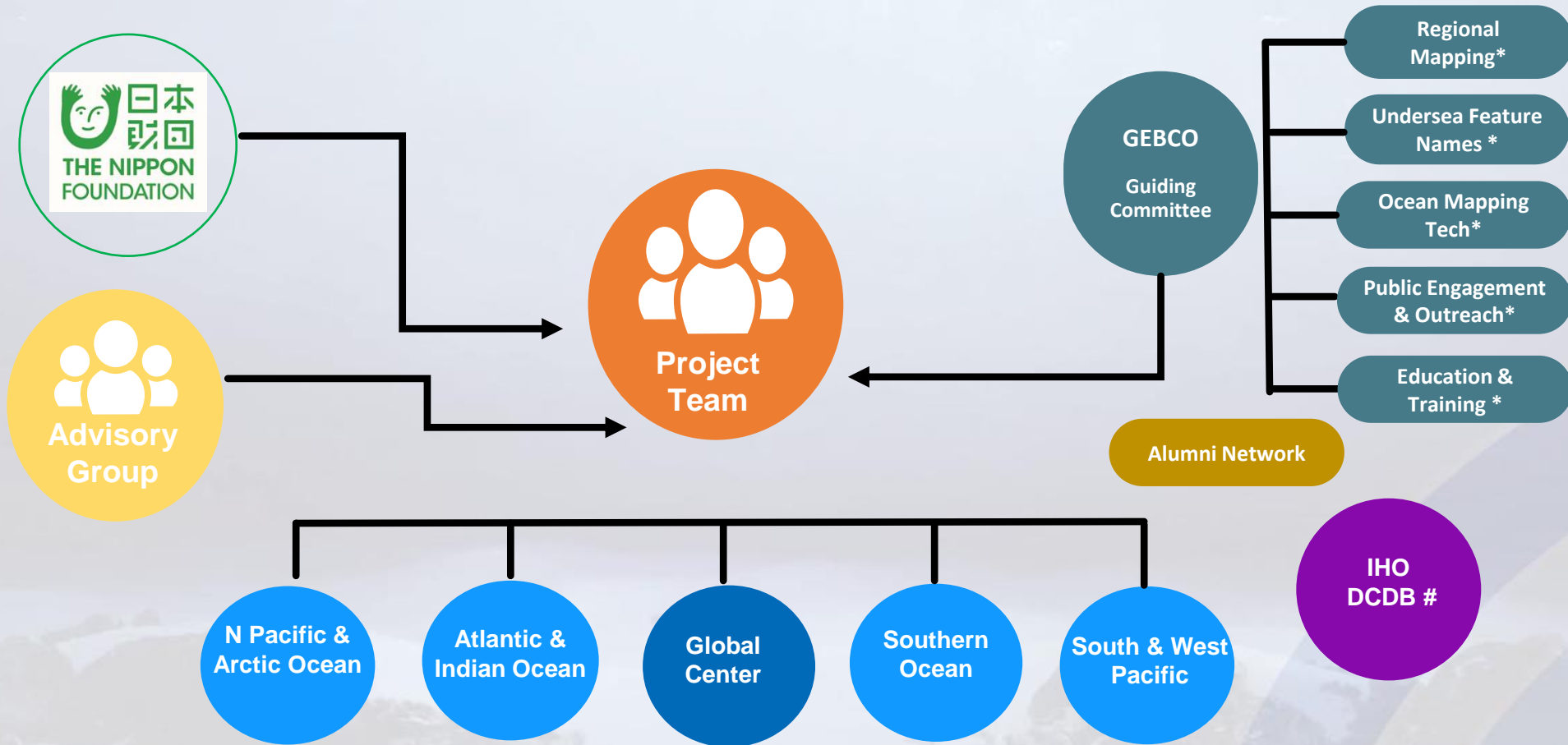


June 2017



June 2021

Seabed 2030 Network

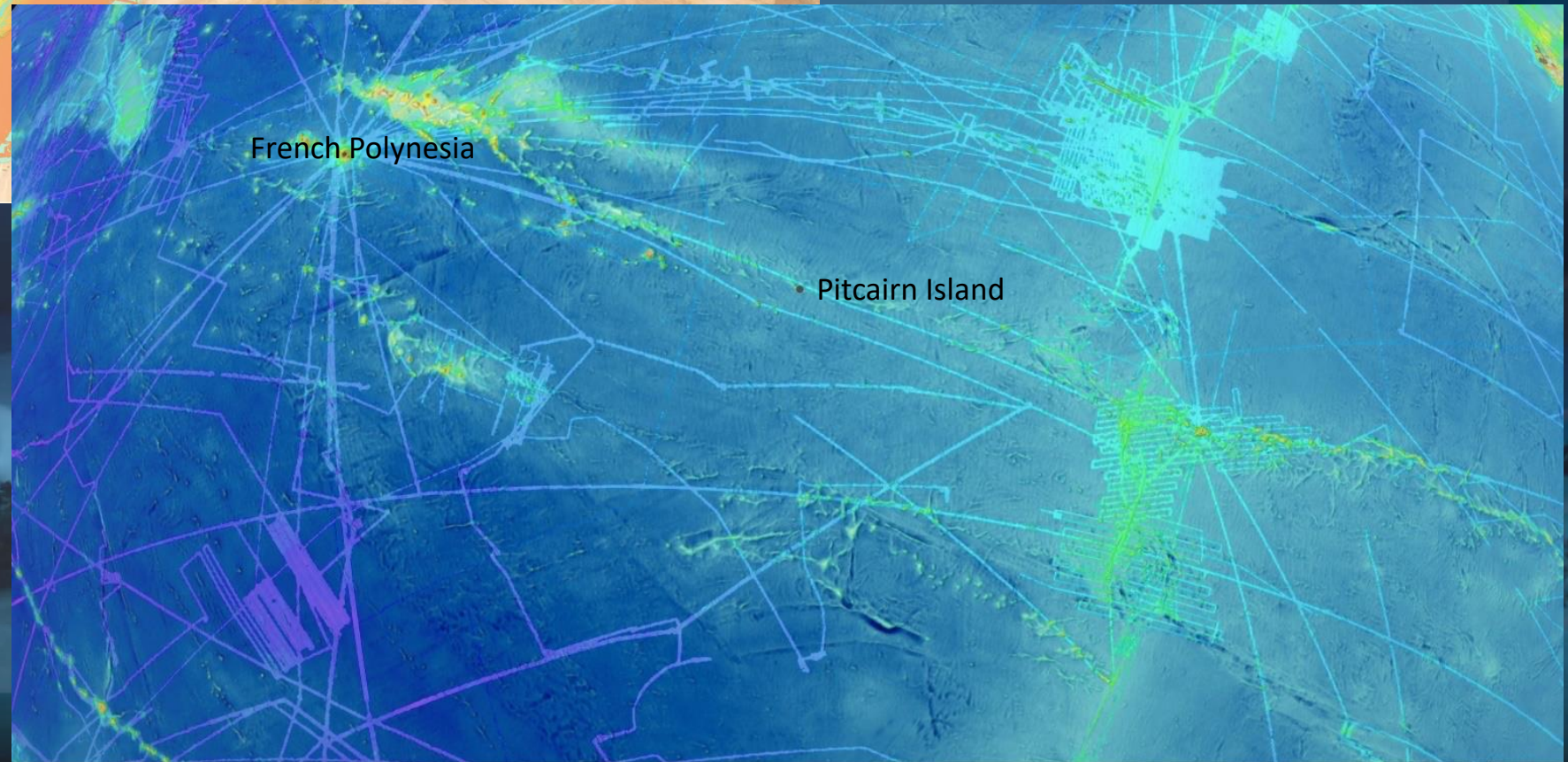
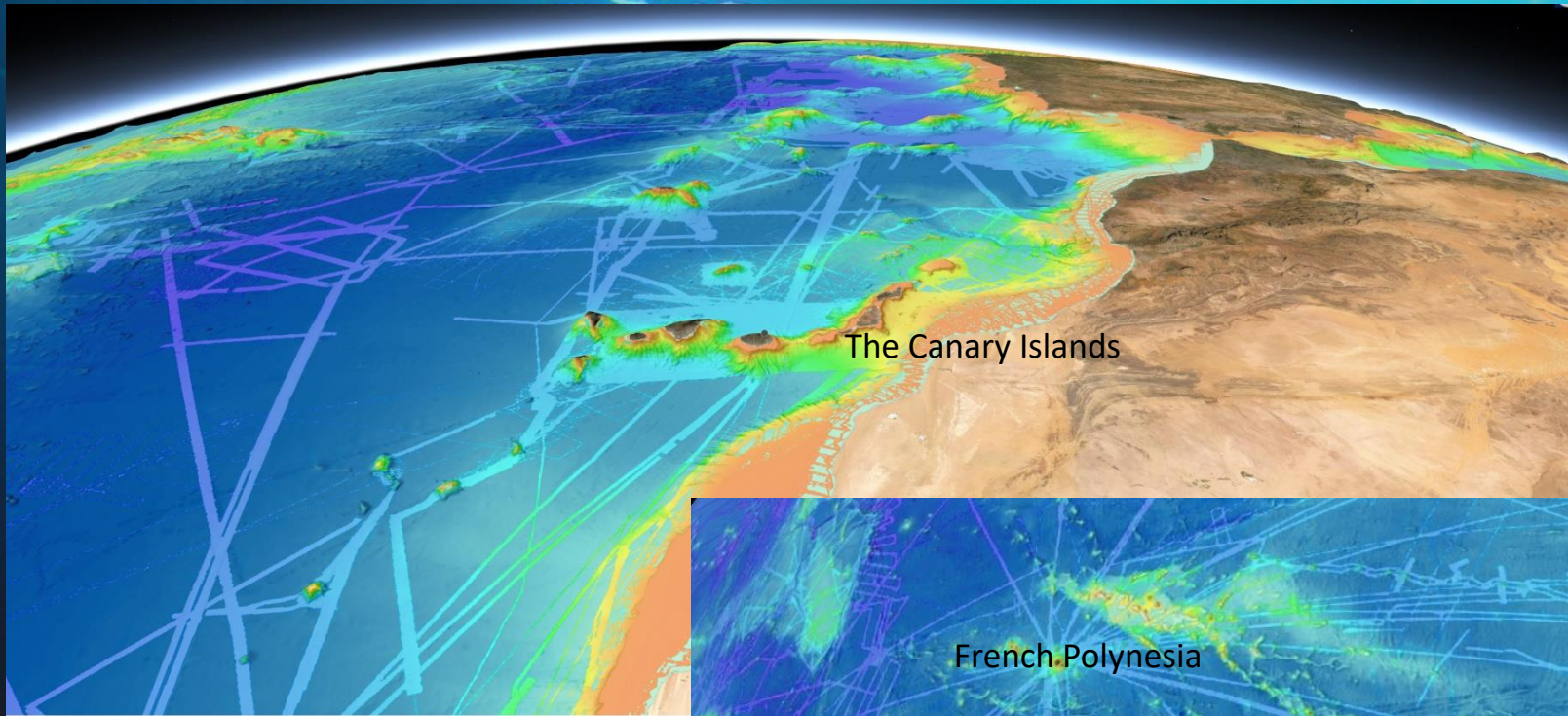


4 “Regional Centers” + 1 “Global Center”

(* GEBCO Sub Committees)

(# Data Centre for Digital Bathymetry)

Paucity of Depth Information



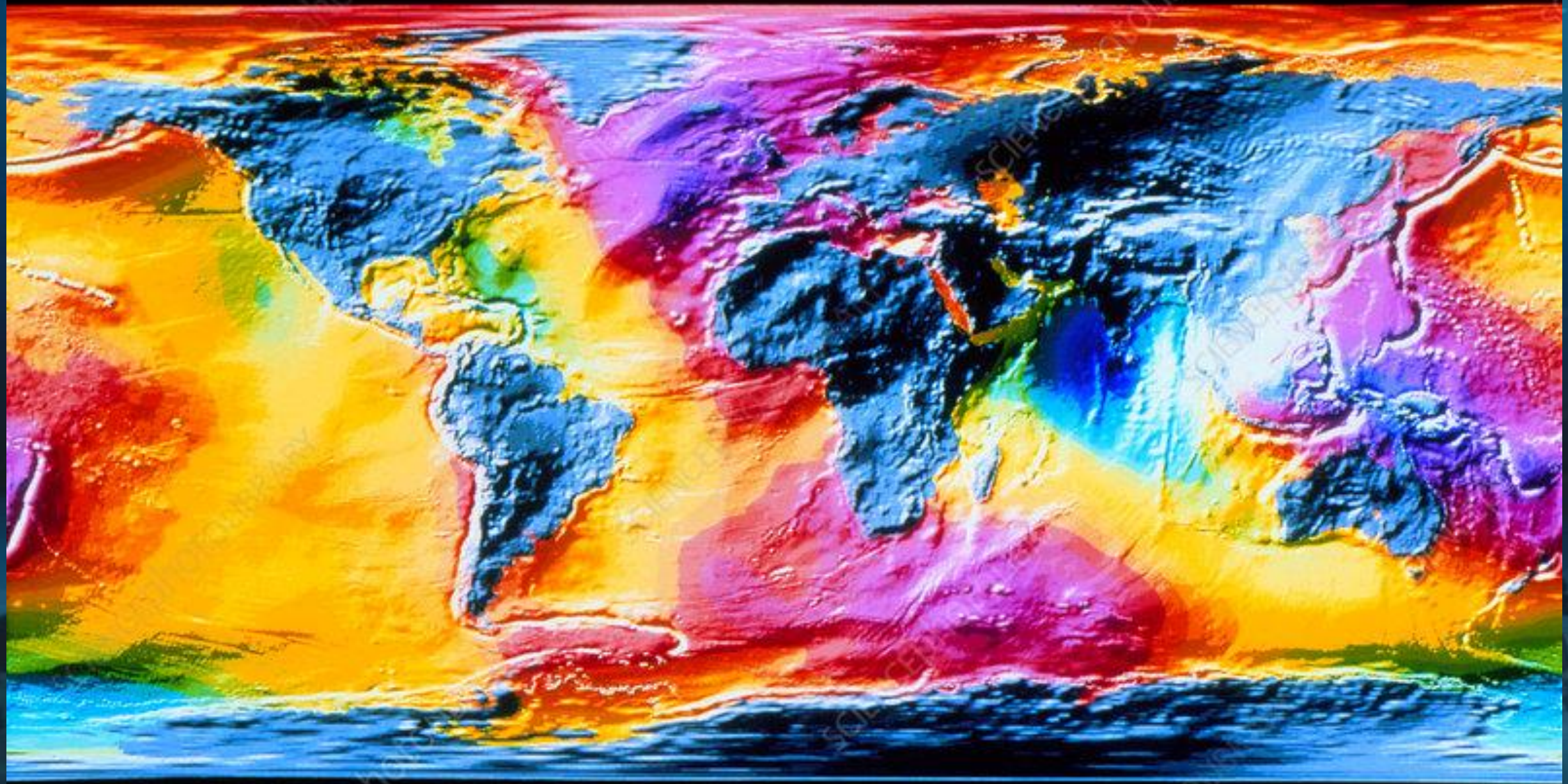
Places where ships can't go..



© www.sut.org

- Very shallow waters – survey ships may be too depth-draught to get in close.
- Contested waters – warfare, piracy, boundary disputes.
- Dangerous waters – unswept minefields, shallow wrecks, weather, ice.
- Remote waters – cost of sending a ship may be too high

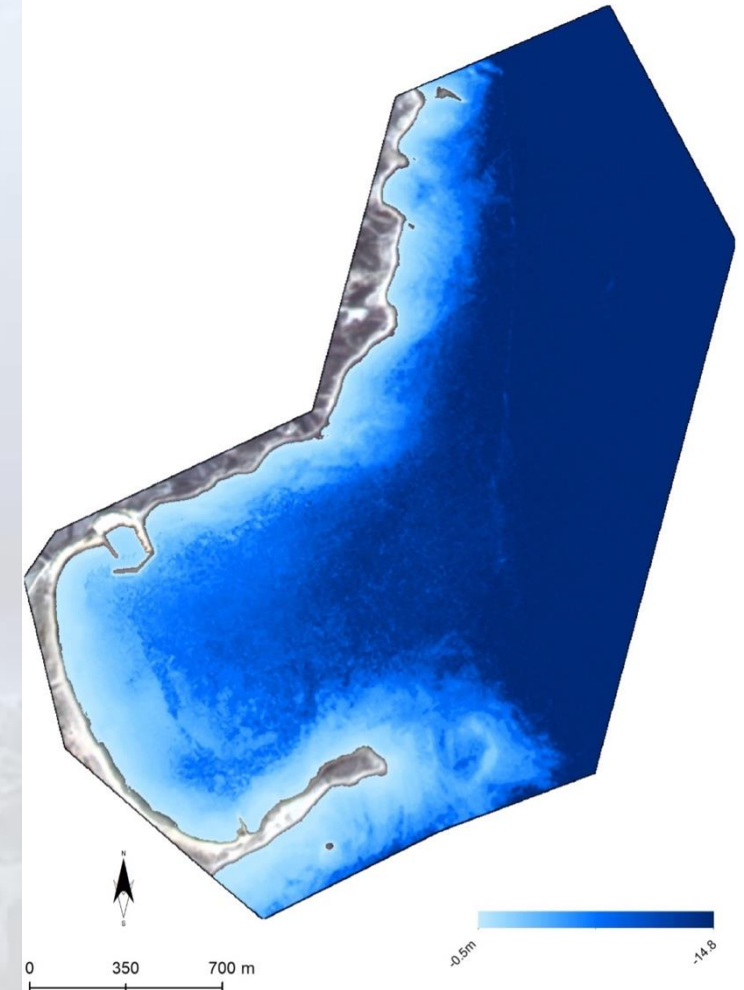
ERS1, 1990s



Satellite Derived Bathymetry

- Physically measuring the depth and shape of the ocean floor with multibeam techniques etc. is accurate – but slow, and very expensive.
- Robotic systems help – but remote sensing is faster and more affordable.
- There are limitations – limited max depth, can't see through ice or turbid conditions – but still gives useful data that is more accurate than legacy maps.
- Perhaps in the future some breakthrough in quantum imaging sensors will enable true ocean transparency, but don't hold your breath waiting for it!

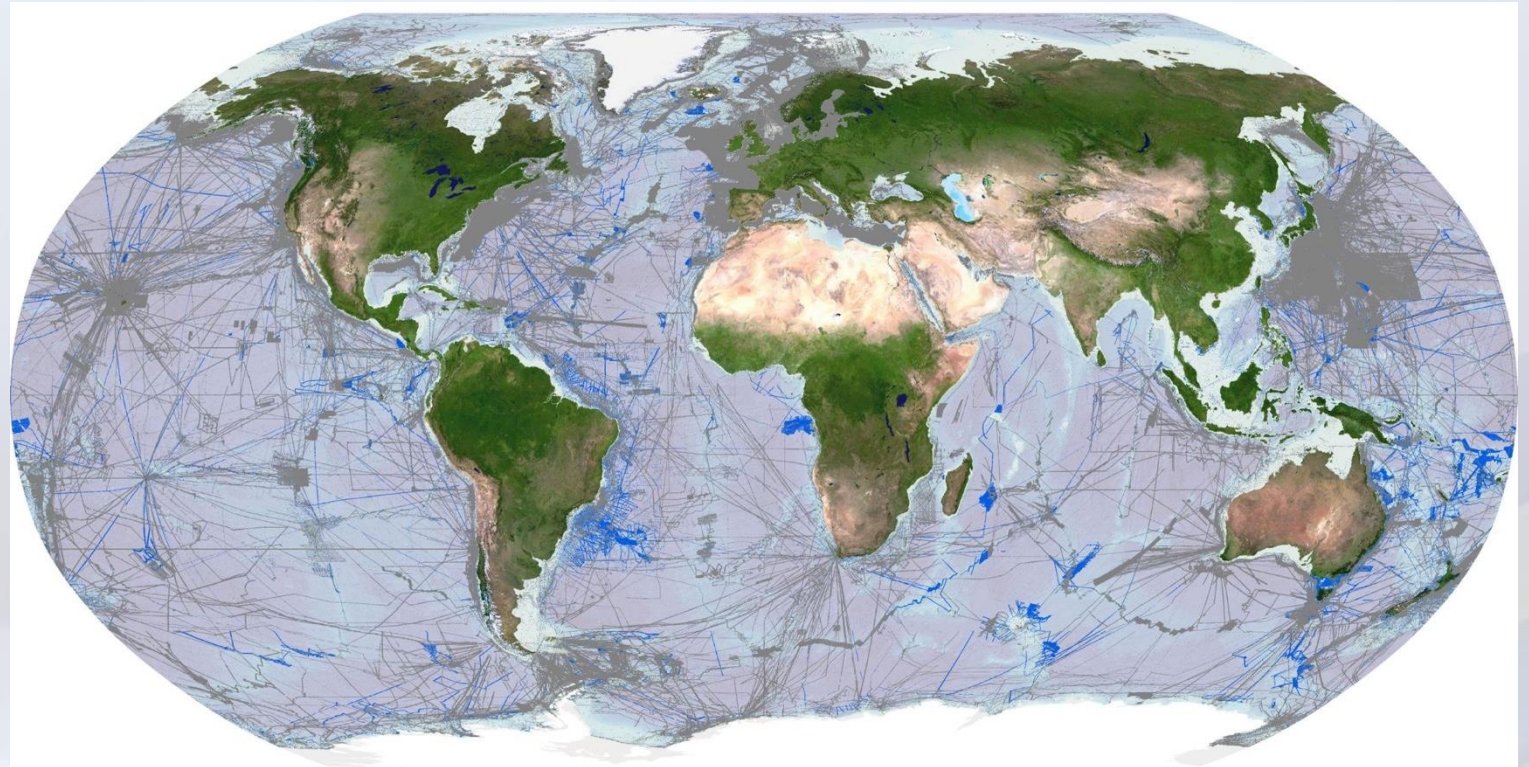
The bathymetry of Plaka area, Lemnos estimated by Planet SuperDove 8-bands imagery on 16/05/2022
Credit – Dimitris Poursanidis, Terrasolutions.eu



Progress so far...

GEBCO 2022 Grid Delivery

- GEBCO Grid stood at 6% coverage when Seabed 2030 began
- Ocean mapping coverage now stands at **23.4%** (June 2022)
- Still over 3/4 of the ocean floor to be mapped



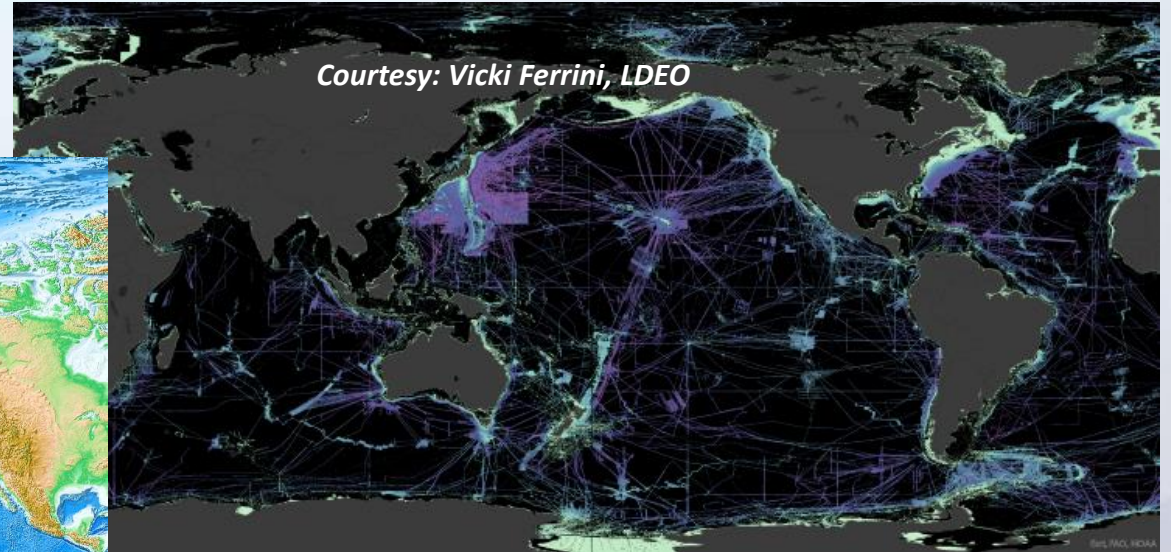
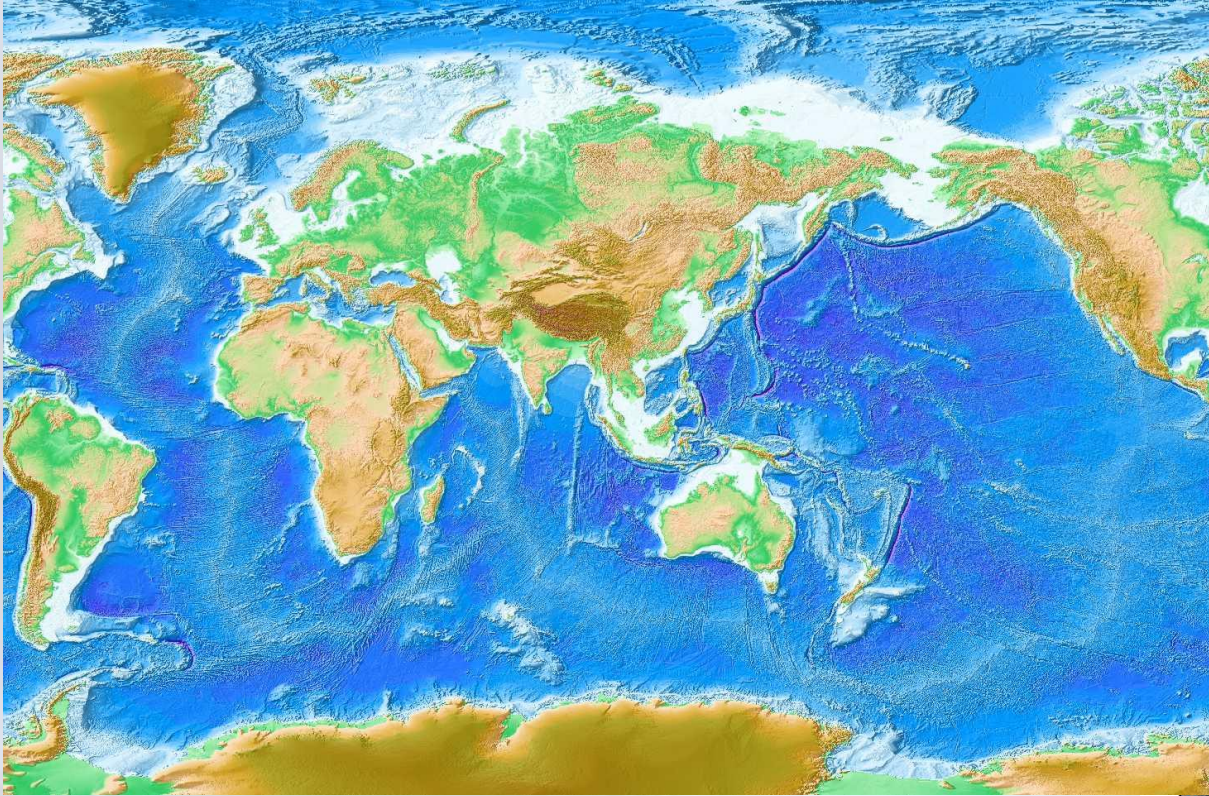
— Data to GEBCO 2021
— Data additions to 2022

Courtesy: Pauline Weatherall, NOC



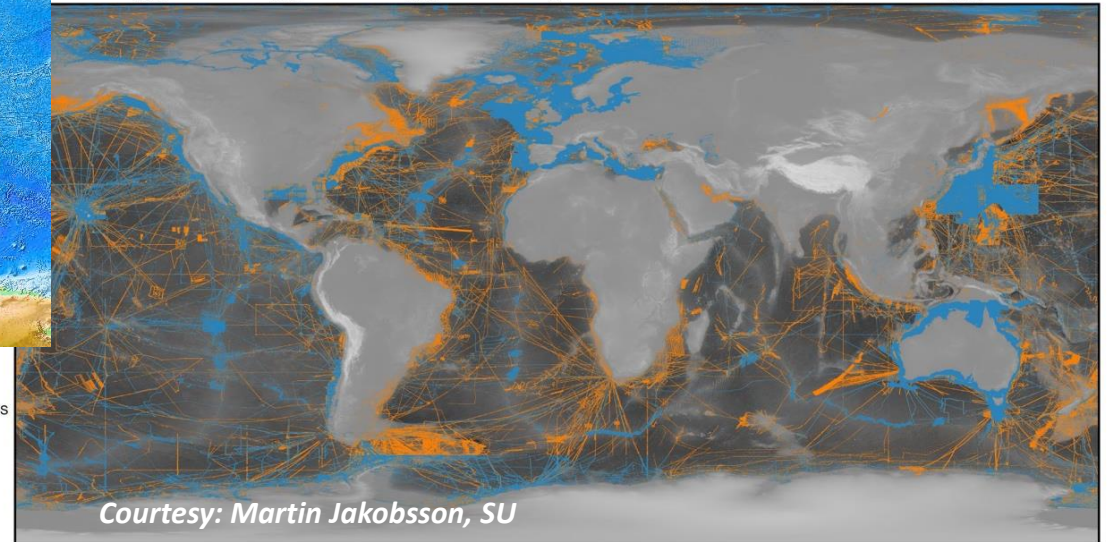
GEBCO Map Portrayal

Courtesy: GEBCO Atlas Manager



Courtesy: Vicki Ferrini, LDEO

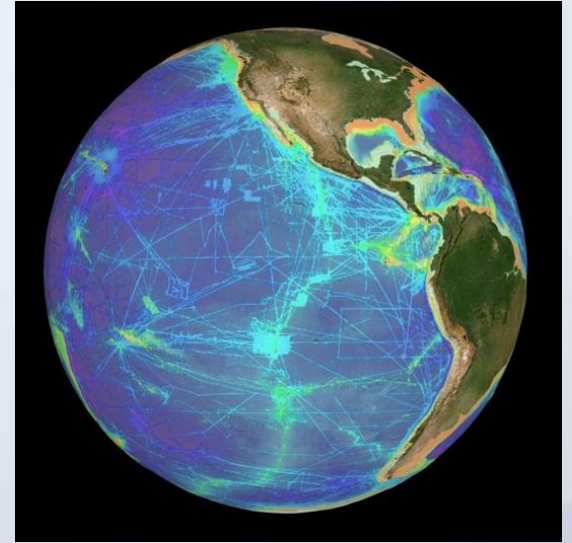
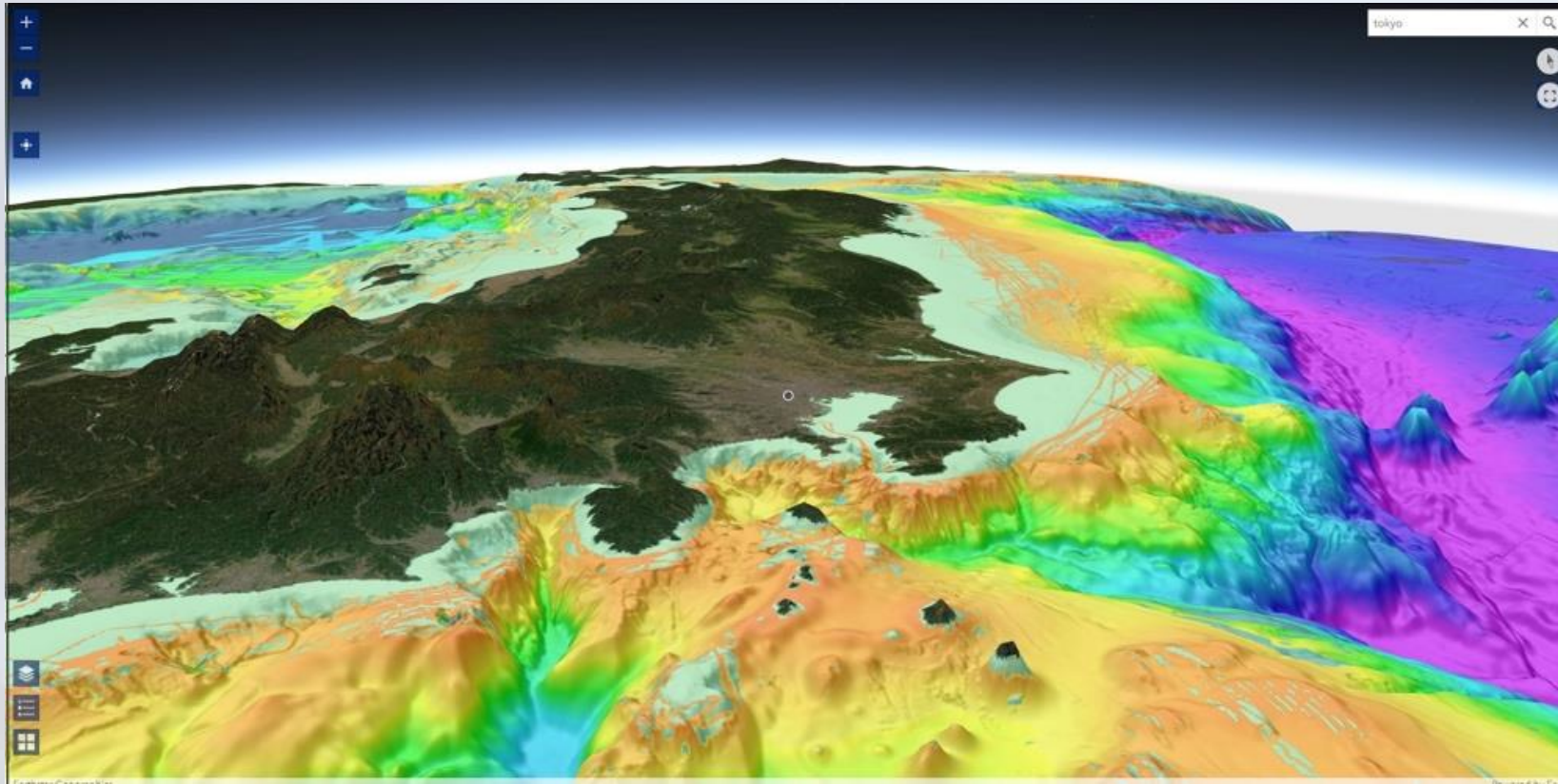
135°W 90°W 45°W 0° 45°E 90°E 135°E



Courtesy: Martin Jakobsson, SU

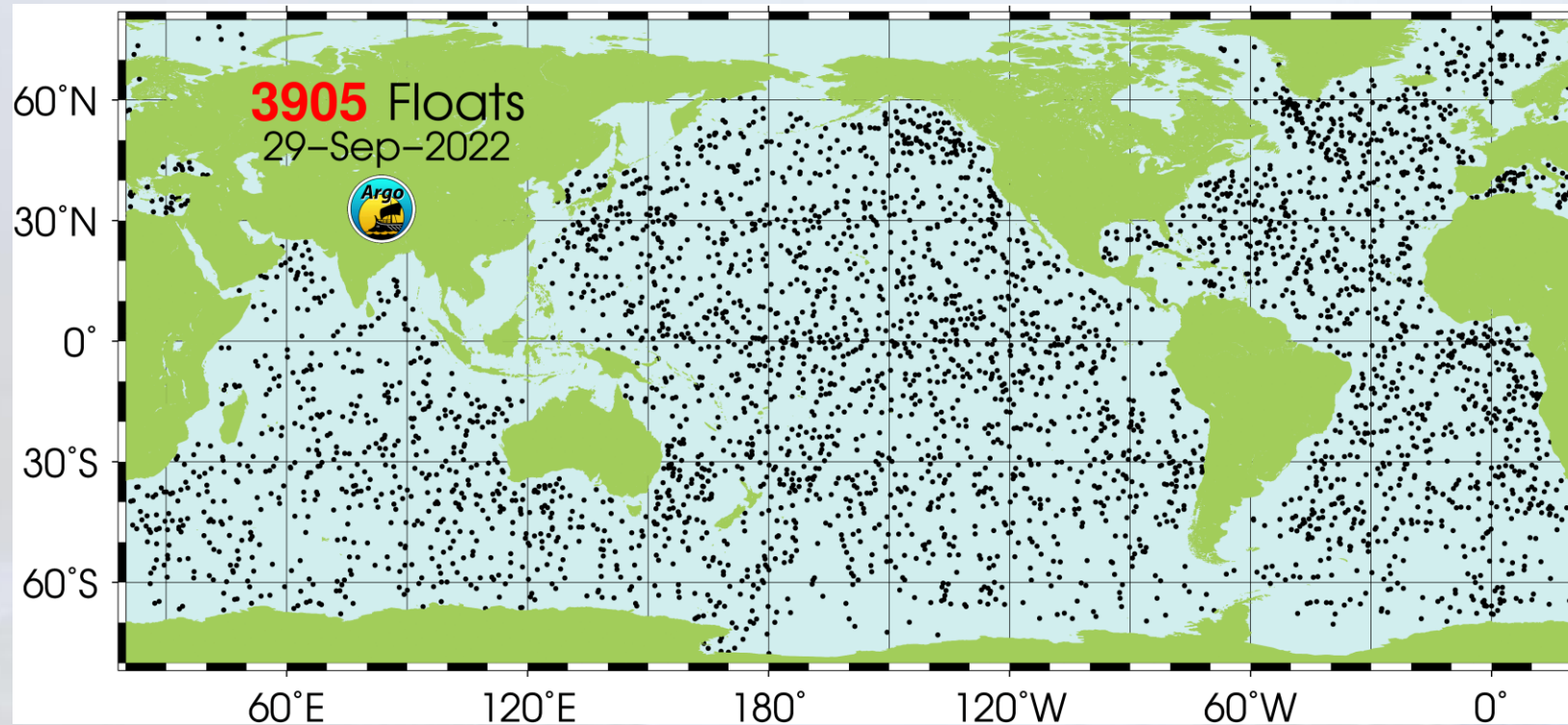
45°S

<https://maps.ccom.unh.edu/portal/apps/instant/3dviewer/index.html?appid=d3a05be59c8a49a58626739c5e41b4b7>



Physical Oceanographers have it easy ;)

Global 'Argo' float network status, as of 29th September 2022 – *some future ARGO floats will also measure the seafloor...*



How do I contribute my data?

The process will vary according to what you have – physical media such as tapes and paper files, versus digital media.

The GEBCO community that Seabed 2030 serves will assist you to make it as smooth and straightforward as possible.

Go to <http://seabed2030.org/contribute> to see the form used to describe your data, and a short video that describes the process.

You can also contact any of the Seabed 2030 team – Steve Hall is partnerships@seabed2030.org or use admin@seabed2030.org



Thank you

