

Crowdsourced Bathymetry

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International Hydrographic Organization
Organisation Hydrographique Internationale

South West Pacific Hydrographic Commission (SWPHC) 20

February 2023



IHO

The IHO Crowdsourced Bathymetry Initiative

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In 2014, the IHO initiated a collaborative project to encourage mariners to collect and contribute “crowdsourced bathymetry”.

Crowdsourced bathymetry (CSB) is the collection and sharing of depth measurements from vessels, using standard navigation instruments, while engaged in routine maritime operations.





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The IHO Crowdsourced Bathymetry Initiative

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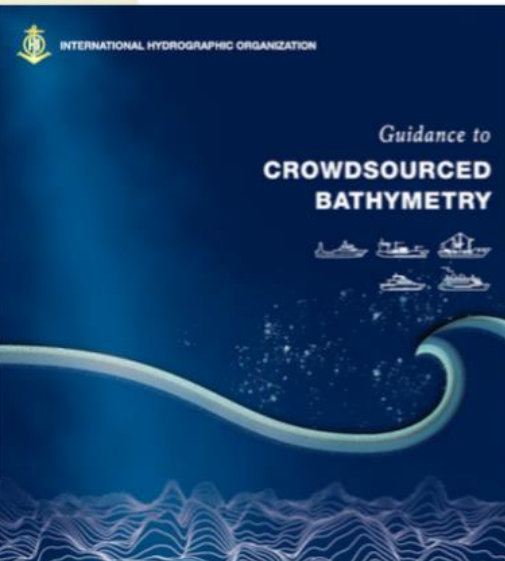
Updates include:

Incorporating feedback from operational use and experience, making the document more "equipment agnostic", simplifying the document and making it more accessible to ALL readers (data collectors, providers and users).

Higher participation of HOs resulted in guidance document that better represents the interests of Member States.

iho.int/uploads/user/pubs/bathy/B_12_CSB-Guidance_Document-Edition_3.0.0_Final.pdf

B-12 Edition 3.0.0



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APPROVED!!

Published by the
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How to Collect & Contribute CSB Data

IHO – DCDB

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- Network of "Trusted Nodes"
 - Data liaisons between mariners (data collectors) and the DCDB.
 - May supply data logging equipment, technical support, data download support and data transfer to the DCDB.
- CSB data minimum required information (XYZ, timestamp).

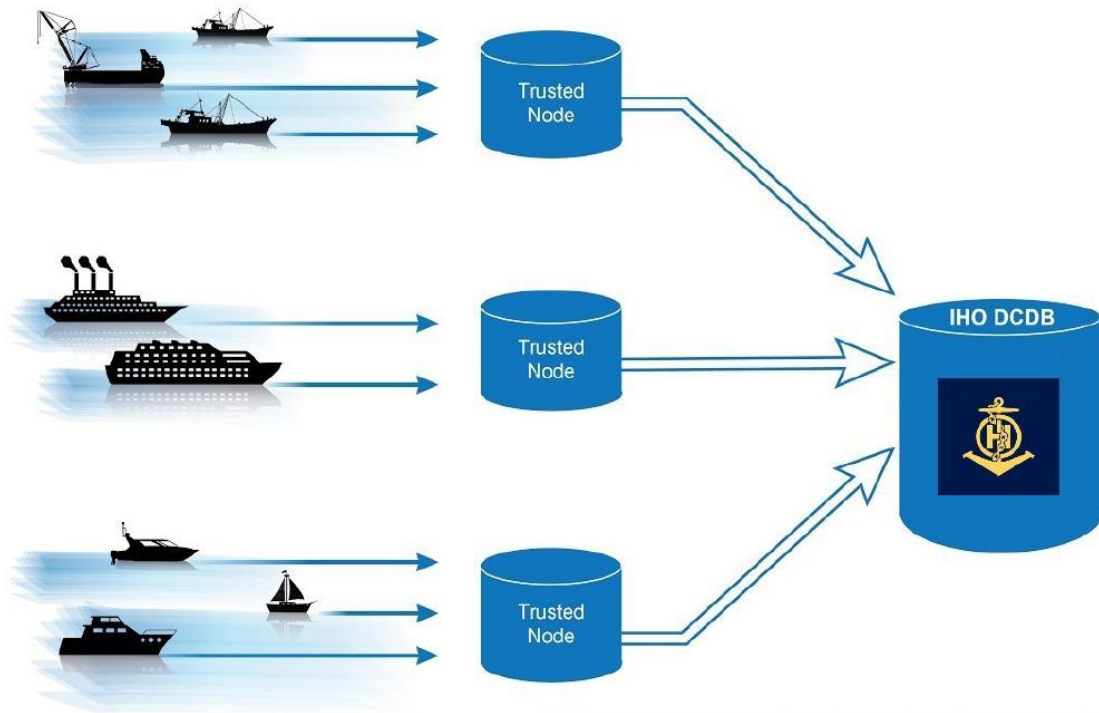


Figure 2. Data flow from vessels, through Trusted Nodes, to the IHO DCDB.



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Current CSB Trusted Nodes

Rose Point Navigation System

- Mariners can enable their electronic charting system log file to record *position, depth, and time*.



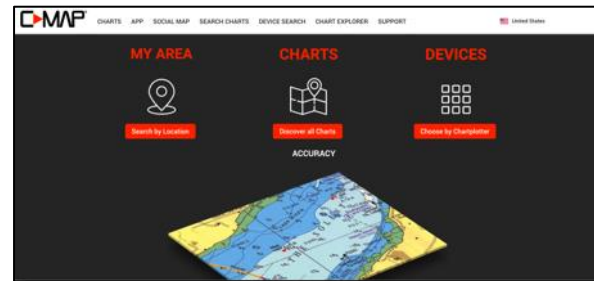
www.rosepointnav.com



Voyage
Data
Recorder

Navico C-MAP

- New CSB feed b/w DCDB & navigation software company.



MacGregor/Carnival Cruise Line

- Data provided by Voyage Data Recorders (VDR)



Petroleum Geo-Services (PGS)

- Data feed from PGS vessels to the DCDB

M2Ocean

- Testing data submissions with data collected by Hydroballs (small autonomous bathymetric buoys)



SmartLog USB
data logger

James Cook University

- Distributed data loggers to volunteer vessels along the Great Barrier Reef





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SEABED 2030 PROJECT

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Data Loggers provided by Seabed 2030

1. Free data loggers provided to the community
2. Installation included
3. *Assistance with data download and delivery to Seabed 2030 & IHO-DCDB*



pacific@seabed2030.org

www.seabed2030.org



Support includes provision of data loggers (NMEA0183 and NMEA2000) and installation support (where needed).

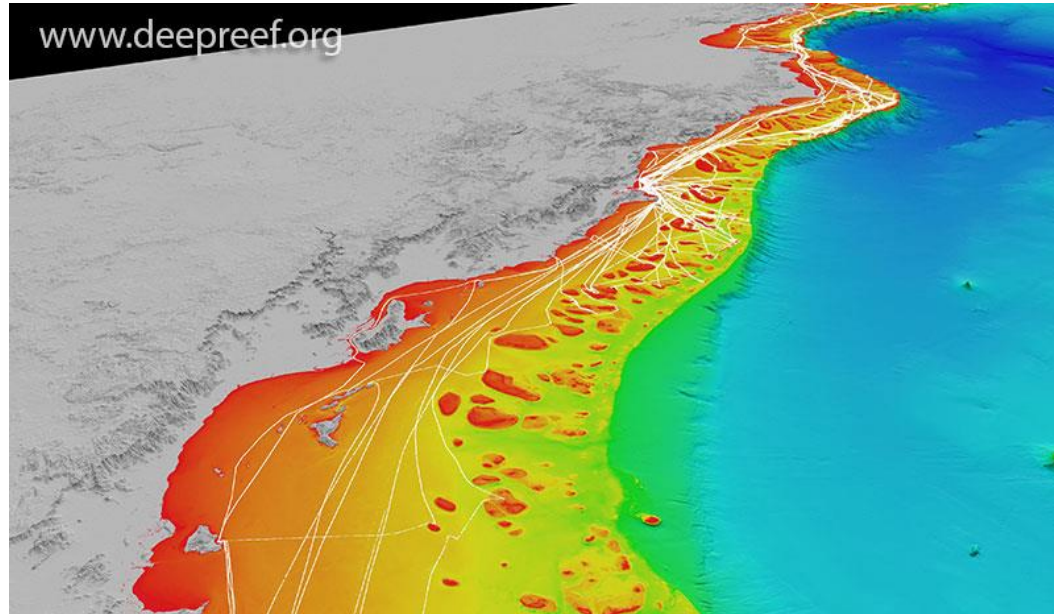


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The Value of CSB Data

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- Data with scientific, commercial & research value at no cost to the public sector
- Fill gaps where data is scarce (eg: Arctic, SIDS)
- Useful along shallow, complex coastlines
- Identify uncharted features
- Assist in verifying charted information
- Confirm whether charts are appropriate for the latest traffic patterns.



3D view of northern Great Barrier Reef showing all vessel tracks as of December 2019

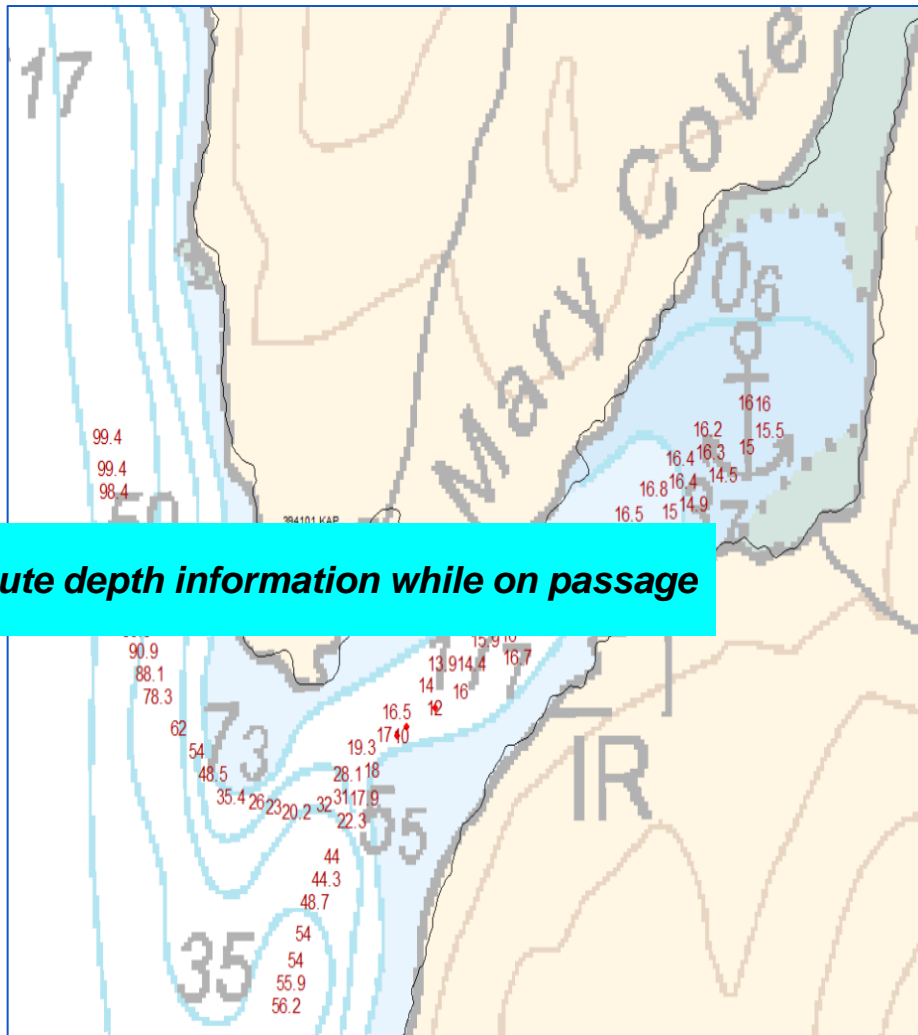


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The Value of CSB Data

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- The Canadian Hydrographic Service has used CSB to update several Inside Passage charts along coastal routes.
- A system that collects depth data from vessels less than 10 m deep, **...but only if vessels collect and contribute depth information while on passage** depths, compilation in areas that were surveyed with single beam.
- CSB helped prioritize survey areas for the following survey season
- CSB has initiated the publication of Notices to Mariners.





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CSB Trusted Nodes – Seabed 2030-funded CSB Programs

Bureau of Marine Transportation - Palau

- 100 data loggers received (NMEA0183 and NMEA2000)
- Coordinating with South & West Pacific Seabed 2030 Data Center
- Received support from U.S. Navy for logger installation and setup.

The Institute For Maritime Technology & The South African Navy HO

- 100 data loggers deployed to SANHO/IMT.
- Planning of trials: identification of stakeholders, establish relationships, feasibility studies, regular communication via various channels.

Greenland Institute of Natural Resources

- Phase 1: aim to engage approximately 50 vessels of various sizes- 30 data loggers deployed so far.



"Sea Lab 1", IMT – trial deployment (Credit: CDR Christoff Theunissen)





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IHO CL 01/2020 & IRCC CL 21/2020

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- All coastal States are requested to indicate their position on the ***provision of CSB data*** from ships within waters subject to their jurisdiction into the public domain
- To date, 33 coastal States (**green**) have replied positively*
- ***Australia, Fiji, France, New Zealand, United States***





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IHO CL 01/2020 & IRCC CL 21/2020

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CL 25/2022 requested approval of B-12 IHO Guidance on Crowdsourced Bathymetry Edition 3.0.0

All Coastal States...”are requested to indicate their position on the provision of CSB data from ships within waters subject to their national jurisdiction into the public domain as well as highlighting ...any caveats they wish to apply to such provision.”

SWPHC IHO Member States:

Australia, Fiji, France, New Zealand, Papua New Guinea, Samoa, Solomon Islands, Tonga, UK, USA, Vanuatu.

SWPHC Observer States:

Cook Islands, Indonesia, Kiribati, Nauru, Niue, Palau

The IHO encourages coastal states to review the circular letters and, if possible, offer a positive response to the IHO Secretariat.

iho.int/uploads/user/circular_letters/eng_2020/CL21_2020_EN_v1.pdf

iho.int/uploads/user/Inter-Regional%20Coordination/IRCC/IRCC_Letters/IRCC_Letter_2020_01_CSB_Activities.pdf



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CL Questionnaire asks:

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- Do you support or object to the CSB data provision for depth measurements from the internal waters, territorial sea, or EEZ of your country?
- Do you wish to be informed when such information is received by the IHO DCDB?
- Do you wish to review such information before its ingestion into the IHO DCDB?
- Do you wish for the opportunity to put caveats on the further dissemination of such data?

https://iho.int/uploads/user/Inter-Regional%20Coordination/CSBWG/MISC/B-12_2020_EN_Acceptance_of_CSB_Data_in_NWJ_v4.0.pdf

Enclosure to IHO CL 21/2020
IHO File S3/2649

CROWDSOURCED BATHYMETRY DATA PROVISION – COASTAL STATE POSITION FOR WATERS SUBJECT TO THEIR NATIONAL JURISDICTION

TEMPLATE FORM

(to be returned to the IHO Secretariat **no later than 4 September 2020**)

E-mail: cl-ic@iho.int - Fax: +377 93 10 81 40)

IHO clarification on Crowdsourced Bathymetry Activity

For the purpose of this Circular Letter, the following terms have the specified meanings:

Bathymetry is the determination of ocean, coastal, and inland water depths. The general configuration of sea floor as determined by profile analysis of depth data.

Crowdsourcing is a process by which people and/or groups voluntarily submit observations, data, or information to accomplish a task or goal.

Crowdsourced bathymetry is defined by the IHO as the collection of depth measurements from vessels, using standard navigation instruments, while engaged in routine maritime operations. Crowdsourced bathymetry data provision is the transmission to the IHO Data Centre for Digital Bathymetry for ingestion, aggregation, categorization, and public dissemination of depth measurements made by vessels, using standard navigation instruments, while engaged in routine maritime operations.

IHO Data Centre for Digital Bathymetry (DCDB) was established in 1990 to steward the worldwide repository of bathymetric data. The Centre archives and shares, freely and without restrictions, depth data contributed by mariners. The IHO DCDB is an IHO resource that is hosted by the U.S. National Oceanic and Atmospheric Administration (NOAA) on behalf of IHO Member States.

Internal Waters, Territorial Sea, and Exclusive Economic Zone have the same meanings as are given those terms under the 1982 UN Convention on the Law of the Sea.

Questions:

- 1) Do you support or object to the crowdsourced bathymetry data provision for depth measurements from the internal waters of your country?

SUPPORT ☐

OBJECT ☐

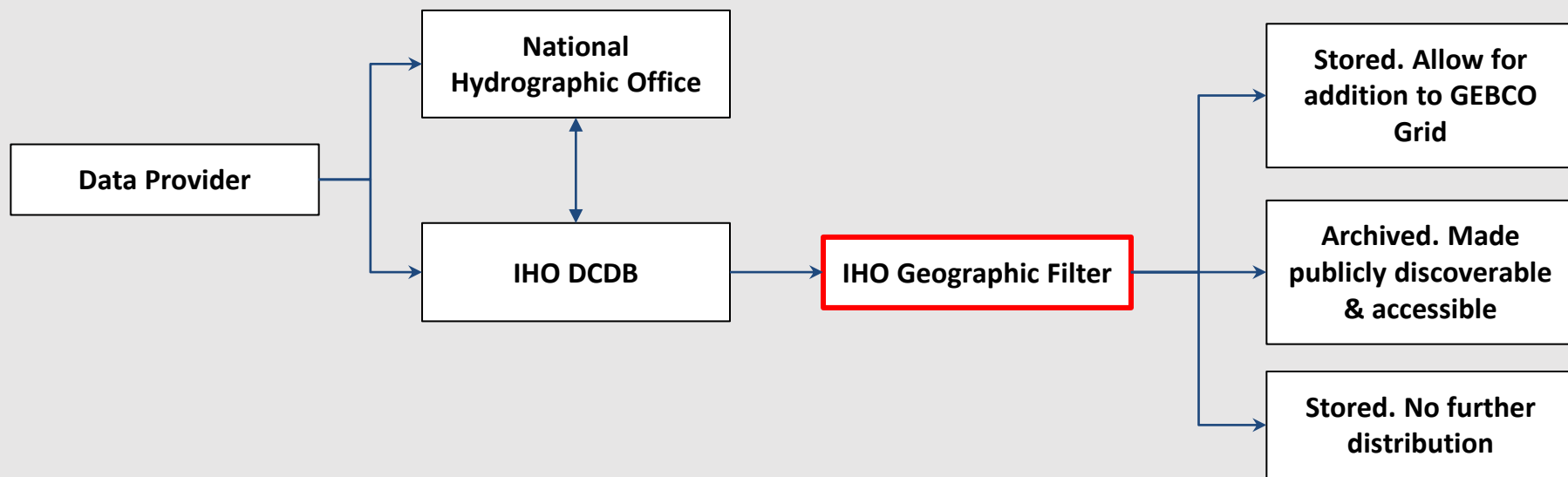
CAVEAT:

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Geographic Filter

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In response to feedback provided to the IHO, the IHO Data Centre for Digital Bathymetry (DCDB) implemented (and continues to update) a geographic filter for incoming data to take into account coastal countries' positions on the distribution of CSB collected in their areas of jurisdiction.

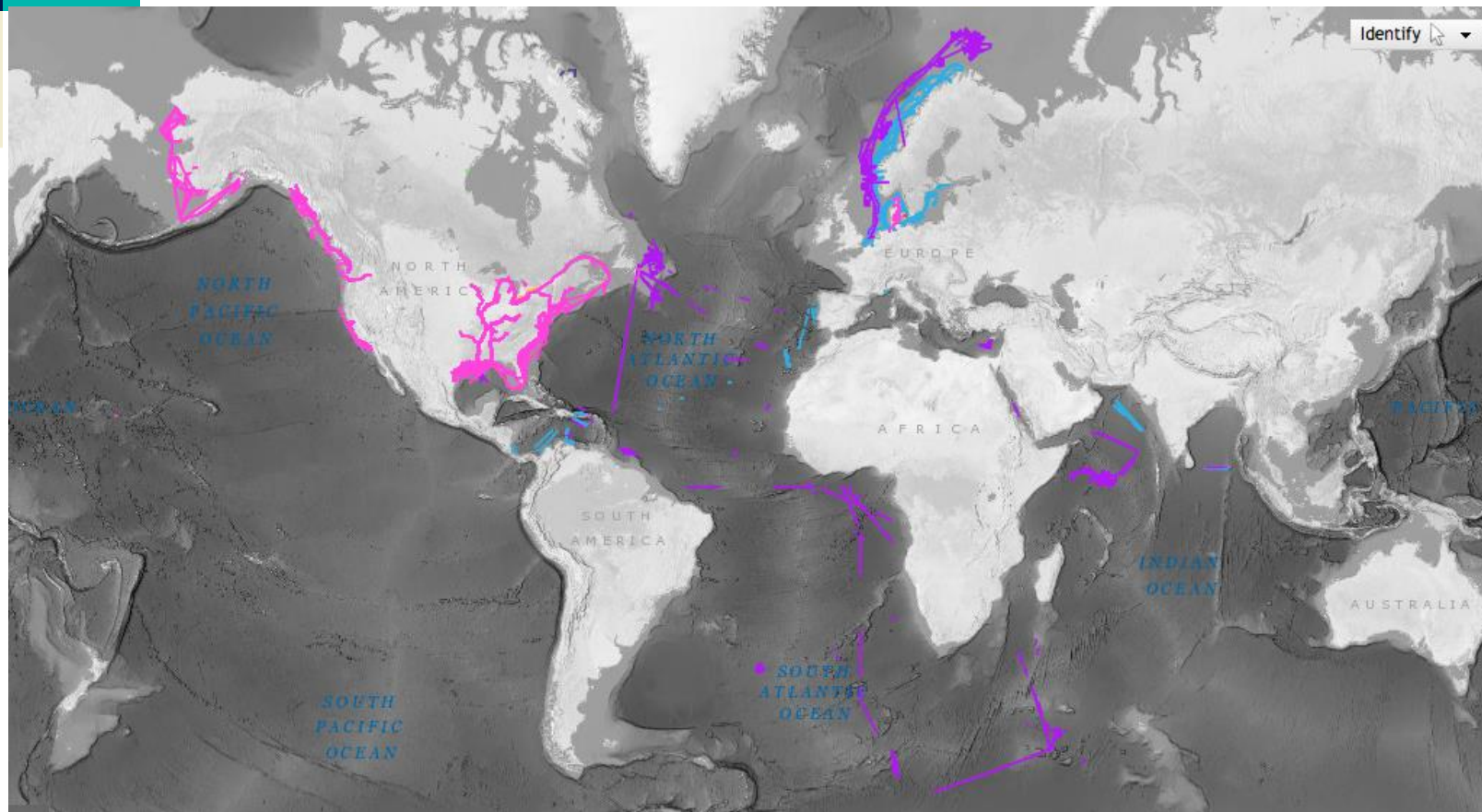




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CSB Data Holdings

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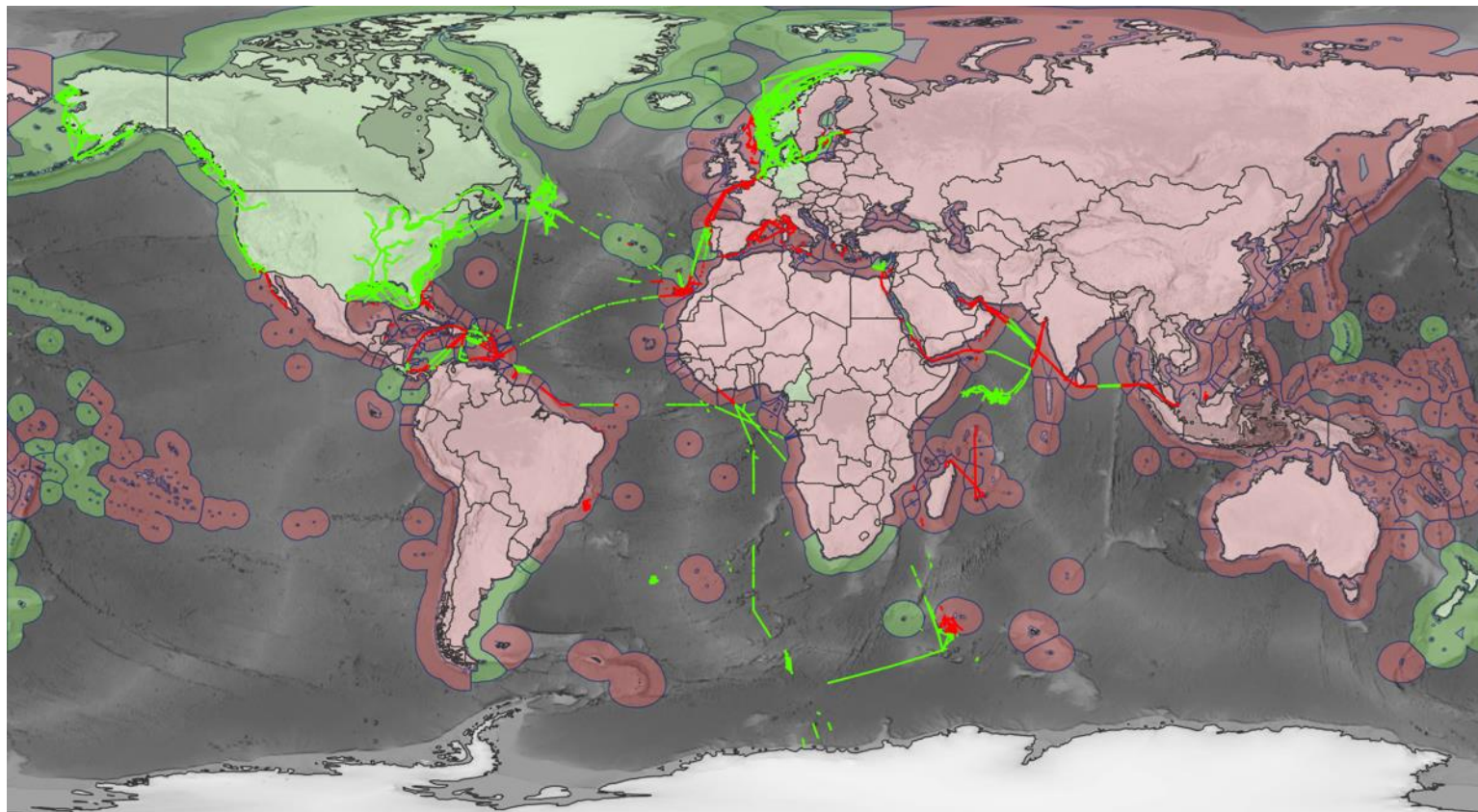
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CSB Data Holdings

Green = Positive Response

Red = Negative Response, No Response

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Map for illustrative purposes only. (Credit: Marine Regions)



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Geographic Filter

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The DCDB is currently working to automate the notification and approval process of data for coastal states who have provided positive responses but request pre-approval of data before the public distribution from DCDB.

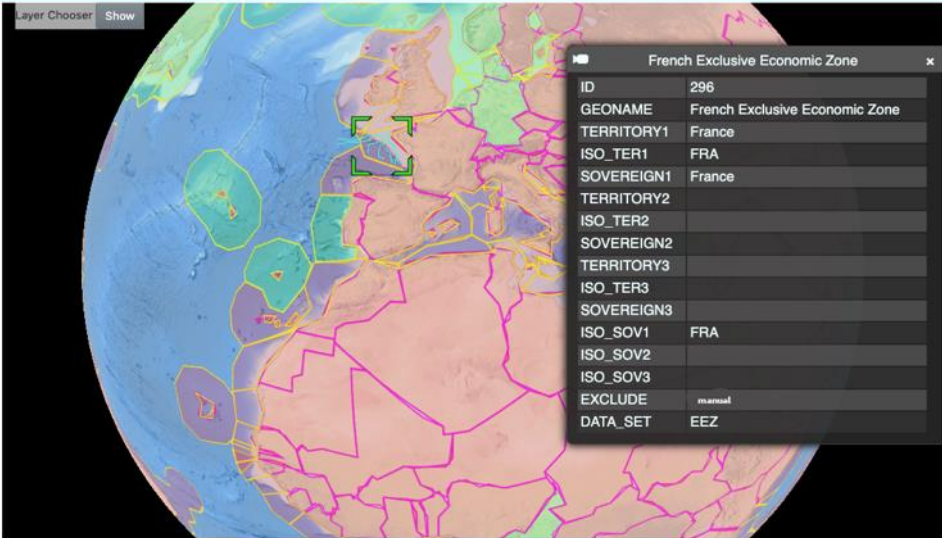
[Home](#) [Manage](#)

Username: Chris Slater [Log Out](#)

Search Areas [Search CSB Data](#)

[Search](#) [Clear](#)

Layer Chooser [Show](#)



French Exclusive Economic Zone

ID	296
GEONAME	French Exclusive Economic Zone
TERRITORY1	France
ISO_TER1	FRA
SOVEREIGN1	France
TERRITORY2	
ISO_TER2	
SOVEREIGN2	
TERRITORY3	
ISO_TER3	
SOVEREIGN3	
ISO_SOV1	FRA
ISO_SOV2	
ISO_SOV3	
EXCLUDE	manual
DATA_SET	EEZ

Trace Id	Publish	External Id	Provider	Platform	Instrument	Start Time	End Time	File Name	File Size	Last Updated
000033e4-759c-4591-af98-04c29f6b967b	true Change	MACGR-9221566-AIDAAURA-oyHjp011	MacGregor	Anonymous		2020-03-28T03:08:33Z	2020-03-28T03:10:16Z	20220322085844674039_9221566-AIDAAURA-oyHjp011.tar.gz	965	2022-03-28T21:17:48.738516Z
000042ca-d435-4d84-ae4-ec04163d4dc2	true Change	MACGR-9221566-AIDAAURA-oyHjp011	MacGregor	Anonymous		2020-04-29T03:00:32Z	2020-04-29T03:02:36Z	20220322083434750180_9221566-AIDAAURA-oyHjp011.tar.gz	798	2022-03-28T15:16:03.354039Z

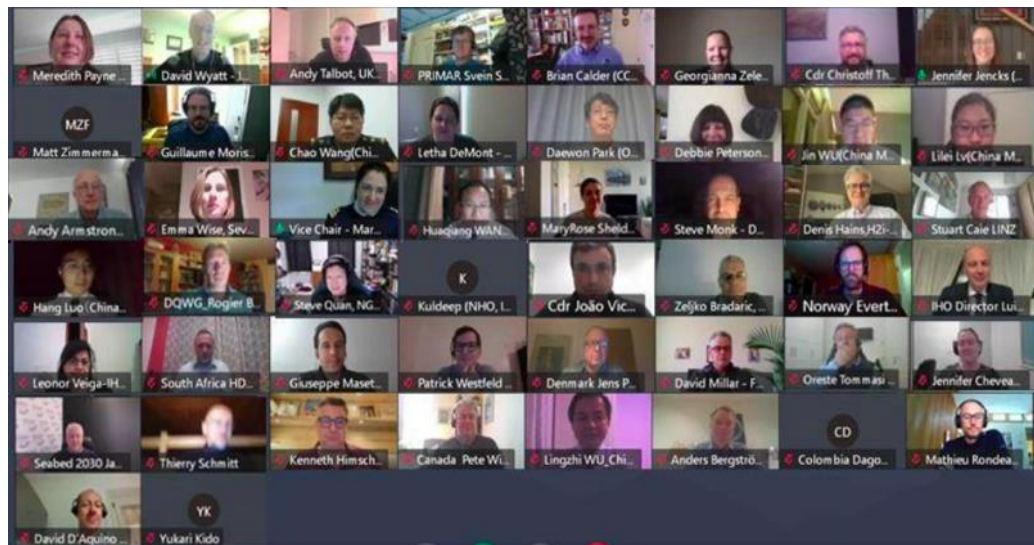


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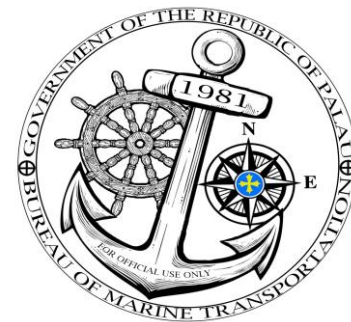
IHO CSB Working Group

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- **Meetings:** 13 meetings, 1 industry workshop
- **Chair:** Jennifer Jencks, USA; **Vice Chair:** Peter Wills, Canada
- **Representatives from 18 Member States:** Canada, China, Denmark, **France**, Germany, India, Italy, Lebanon, Mexico, Netherlands, **New Zealand**, Norway, Portugal, South Africa, Sweden, **UK**, Uruguay, **USA**
- **IHO Secretariat:** IHO Assistant Director Sam Harper, IHO Director Luigi Sinapi



- **Observers and expert contributors:** CCOM-JHC, CIDCO, CIRES, Da Gamma Maritime Ltd, Dongseo U, Dock Tech, ECC AS, ESRI, FarSounder, FLIR Systems AB, Fugro, GMATEK, Inc., H2i, James Cook U, JAMSTEC, Navico/C-Map, ONE Data Tech Co., Olex, Orange Force Marine, PYA, Seabed 2030, Sea-ID, SevenCs/ChartWorld, TeamSurv, Teledyne CARIS, World Maritime University, and World Ocean Council



Palau - Seabed 2030 CSB project

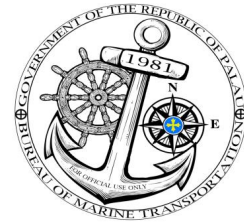
Hayes Moses & Belen Jimenez

SWPHC Hydrographic Governance Workshop
Wellington 20th – 21st February 2023



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PALAU CSB DATA LOGGER PROJECT



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How did it all start?

- Palau expressed interest at 2020 SWPHC
- Seabed 2030 project provided 100 loggers
- NGA assisted with installation





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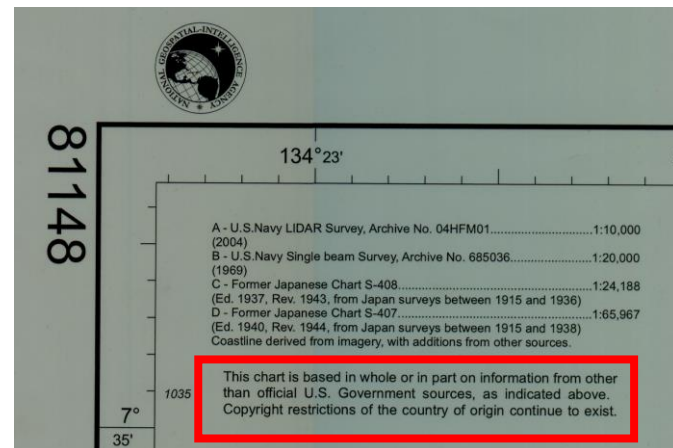
PALAU CSB DATA LOGGER PROJECT



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BENEFITS OF CSB DATA LOGGERS

- Improved charts and products
- Update bathymetrical data for all of Palau
- Collect data for southwest islands
- Contribute to the global effort to map the world's oceans by 2030





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PALAU CSB DATA LOGGER PROJECT



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Lessons Learned

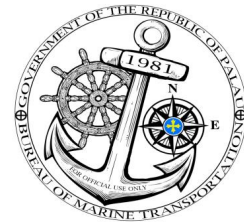
- Lack of capacity and know how in installation
- Depends on vessel's equipment
- Need standards in place to guide processes
- Need for multiple vessels running the same route
- Importance of regular data download





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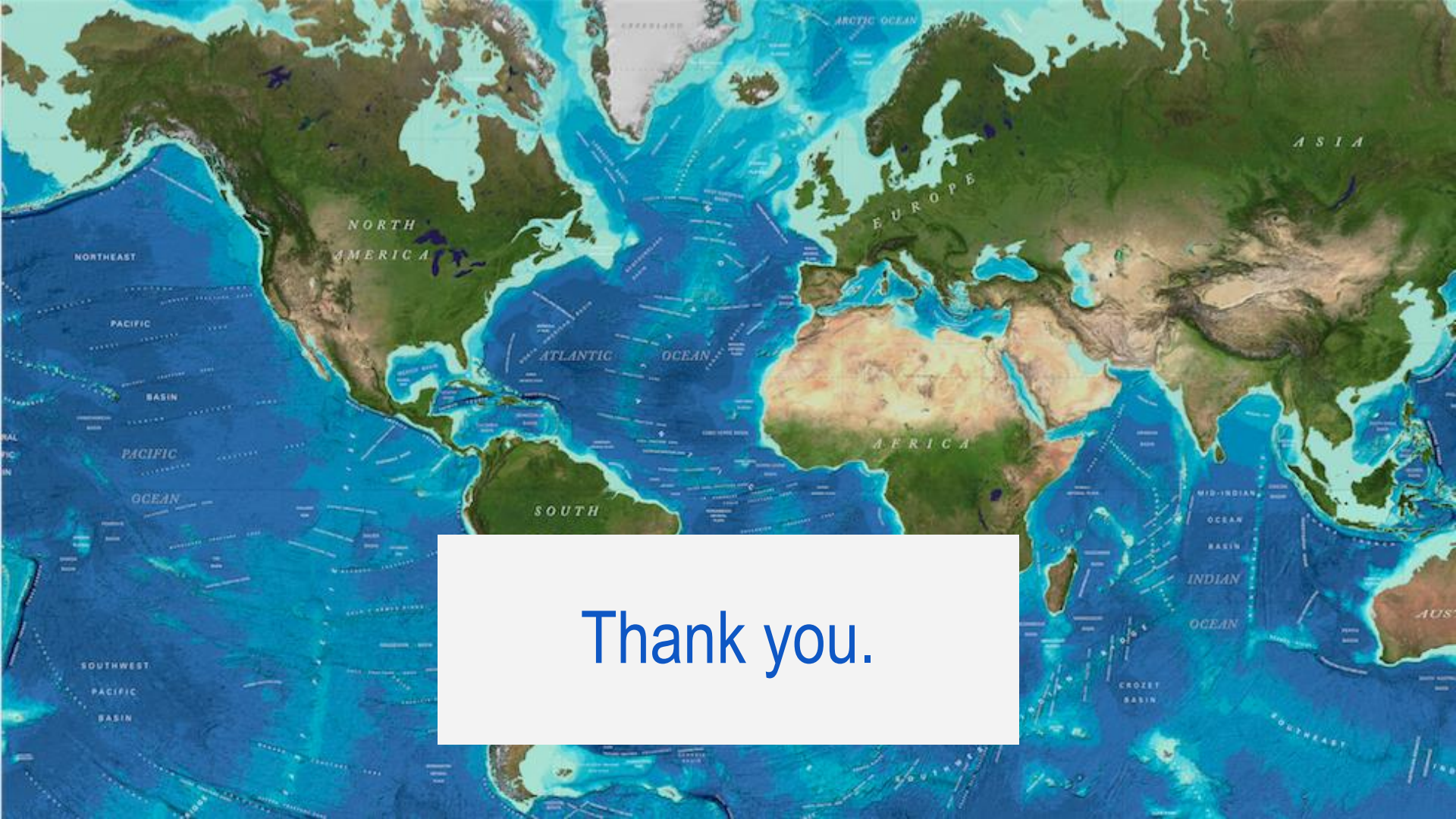
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- 1. Can you see benefits in installing Data Loggers in your country?**
- 2. Do you have any questions about CSB & Data Loggers?**
- 3. Did you know there is an IHO document on CSB Guidance?**
- 4. Have you heard about the IHO CL on CSB?**

[IHO CSBWG Communication material – Targeted to different stakeholders](#)

[IHO CL on CSB – Accepting CSB in your area can have huge benefits when survey capability is limited](#)



Thank you.