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The IHO Data Center for Digital Bathymetry

Overview & Update



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CSBWG Member

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Global Center

Based at the British Oceanographic Data Centre (BODC) in the UK, Seabed 2030's Global Center produces centralised GEBCO products, including the gridded bathymetric data products - aka the definitive map of the seabed which is updated annually - using data sets provided by the Regional Centers.

GLOBAL CENTER >

Southern Ocean Regional Center

Hosted at the Alfred Wegener Institute (AWI) in Germany, the Southern Ocean Regional Center oversees mapping activities in the Southern Ocean region, covering an area of almost 52 million km² of ocean south of 50°S. It covers an area spanning the southern tip of Chile and Argentina, through to the coast of Antarctica - covering the Antarctic Circumpolar Current, including the Drake Passage.

SOUTHERN OCEAN >

Atlantic and Indian Oceans Regional Center

Covering an area of more than 140 million km², the Atlantic and Indian Oceans Regional Center is based at the Lamont-Doherty Earth Observatory of Columbia University, USA. Its remit extends from 60°N to 50°S, from the Americas in the west to Australia in the East (to 140°E).

ATLANTIC & INDIAN OCEAN >

Arctic and North Pacific Ocean Regional Center

Responsible for mapping activities and data compilation in the Arctic and Northern Pacific Ocean region, this Regional Center is jointly hosted by the Center for Coastal and Ocean Mapping at the University of New Hampshire, and the Department of Geological Sciences at Stockholm University, Sweden.

ARCTIC & NORTH PACIFIC OCEAN >

South and West Pacific Ocean Regional Center

Covering an area exceeding 123 million km² from South America to Australia, between 10°N and 50°S, and the western part of the Pacific Ocean, including East Asia, to 50°N, the South and West Pacific Regional Center's scope also includes the world's deepest trenches and from numerous tiny atolls to the world's most populous nation. The center is based at the New Zealand National Institute of Water and Atmospheric Research (NIWA).

SOUTH & WEST PACIFIC OCEAN >

IHO Data Center for Digital Bathymetry

The IHO Data Center for Digital Bathymetry (DCDB) stewards the worldwide collection of bathymetric data - it archives and shares, freely and without restrictions, depth data acquired by hydrographic, oceanographic and other vessels during surveys or while on passage. The DCDB also acts as the central repository for raw bathymetric data and all data compiled by Seabed 2030.

IHO DATA CENTER >



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May 2023: A Memorandum of Understanding was signed to reaffirm NOAA's relationship with the IHO as the host of the IHO DCDB



During the IHO Assembly, the signing of the MoU was recognized by IHO Secretary General Dr. Mathias Jonas and Rear Admiral Benjamin Evans, U.S. National Hydrographer and Director of NOAA's Office of Coast Survey.



IHO Data Centre for Digital Bathymetry (DCDB)

The IHO DCDB was established in 1990 to steward the worldwide collection of bathymetric data. The Centre archives and shares, freely and without restrictions, depth data contributed by mariners. The IHO DCDB is hosted by the [U.S. National Oceanic and Atmospheric Administration \(NOAA\)](http://www.noaa.gov) on behalf of the IHO Member States.



IHO DCDB Data Viewer highlighting ship tracks and data availability over the Pacific Ocean and neighboring regions

The DCDB archive includes over 30 terabytes of oceanic depth soundings acquired with multibeam and singlebeam sonars by hydrographic, oceanographic and industry vessels during surveys or while on passage.

The DCDB also archives and provides access to data contributed in support of the [IHO Crowdsourced Bathymetry \(CSB\) initiative](#).

The [IHO DCDB Data Viewer](#) shows the global coverage of the DCDB's bathymetric data holdings as well as the spatial extent of data archived at other repositories via web services.

[Access Data](#)



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DCDB Data Holdings



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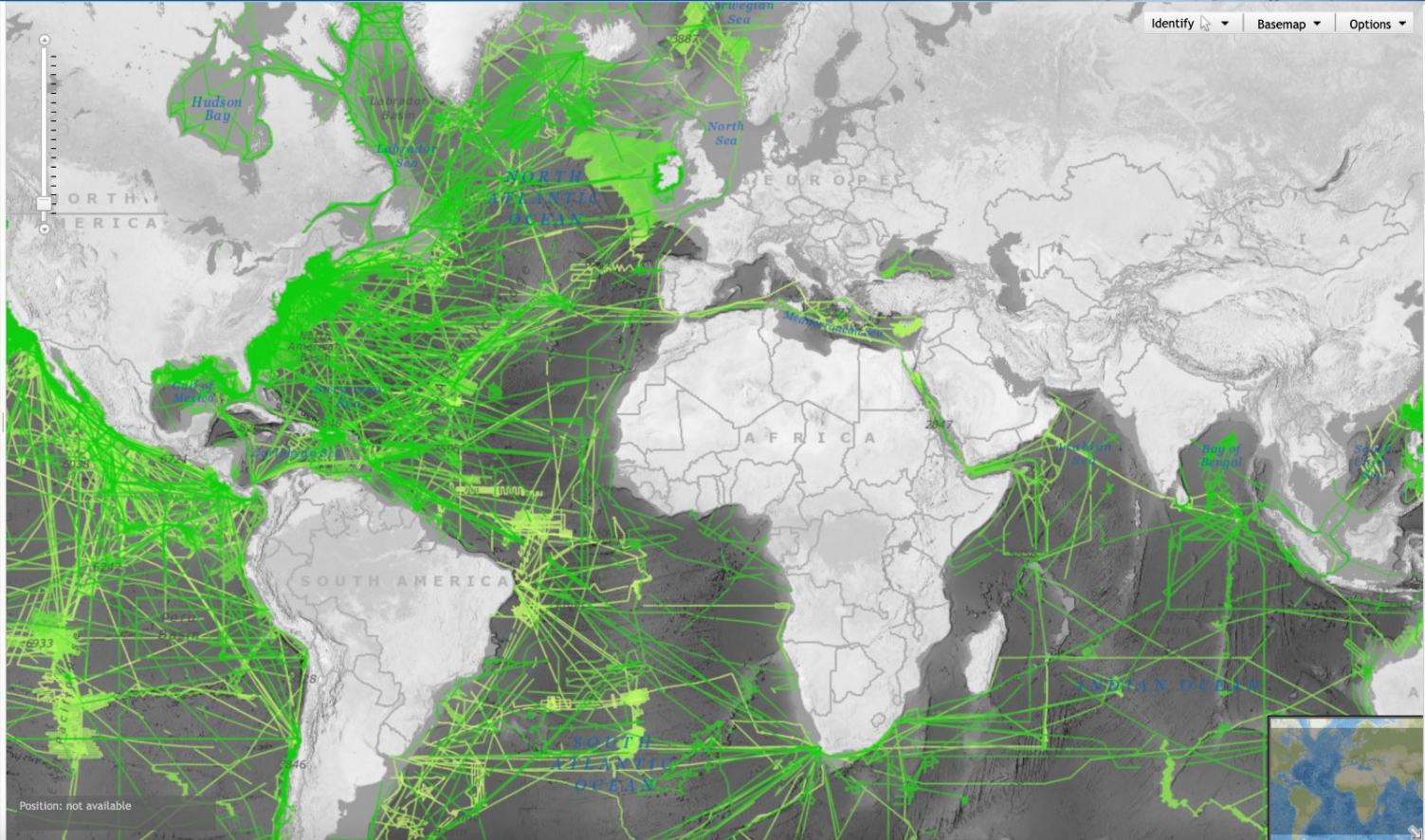
Data Centre for Digital Bathymetry Viewer

Layers

- ▼ IHO DCDB/NOAA NCEI [?](#)
- Multibeam Surveys [?](#)
- Multibeam Survey Footprints [?](#)
- Multibeam Bathymetry Mosaic [?](#)
- Single-Beam Surveys [?](#)
- Single-Beam Sounding Density [?](#)
- NOAA Hydrographic Surveys: [?](#)
- All Surveys with Digital Data
- Surveys with BAGs
- BAG Shaded Relief Imagery [?](#)
- [?](#)
- Crowdsourced Bathymetry Files [?](#)
- [?](#)
- U.S. Bathymetry Coverage and Gap Analysis [?](#)

- ▶ EMODnet
- ▶ Australia
- ▶ Canada
- ▶ France
- ▶ Germany
- ▶ Japan
- ▶ Netherlands
- ▶ New Zealand
- ▶ Norway
- ▶ Portugal
- ▶ United Kingdom
- ▶ Other Data Sources
- ▶ Known Non-Public Data [?](#)
- ▶ Bathymetric Coverage Maps

- Grid Extract
- More Information
- Help



Identify [?](#) Basemap [?](#) Options [?](#)

- Mercator
- Arctic
- Antarctic

Position: not available



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New Multibeam Data Holdings



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Data Centre for Digital Bathymetry Viewer

Layers

IHO DCDB/NOAA NCEI [?](#)

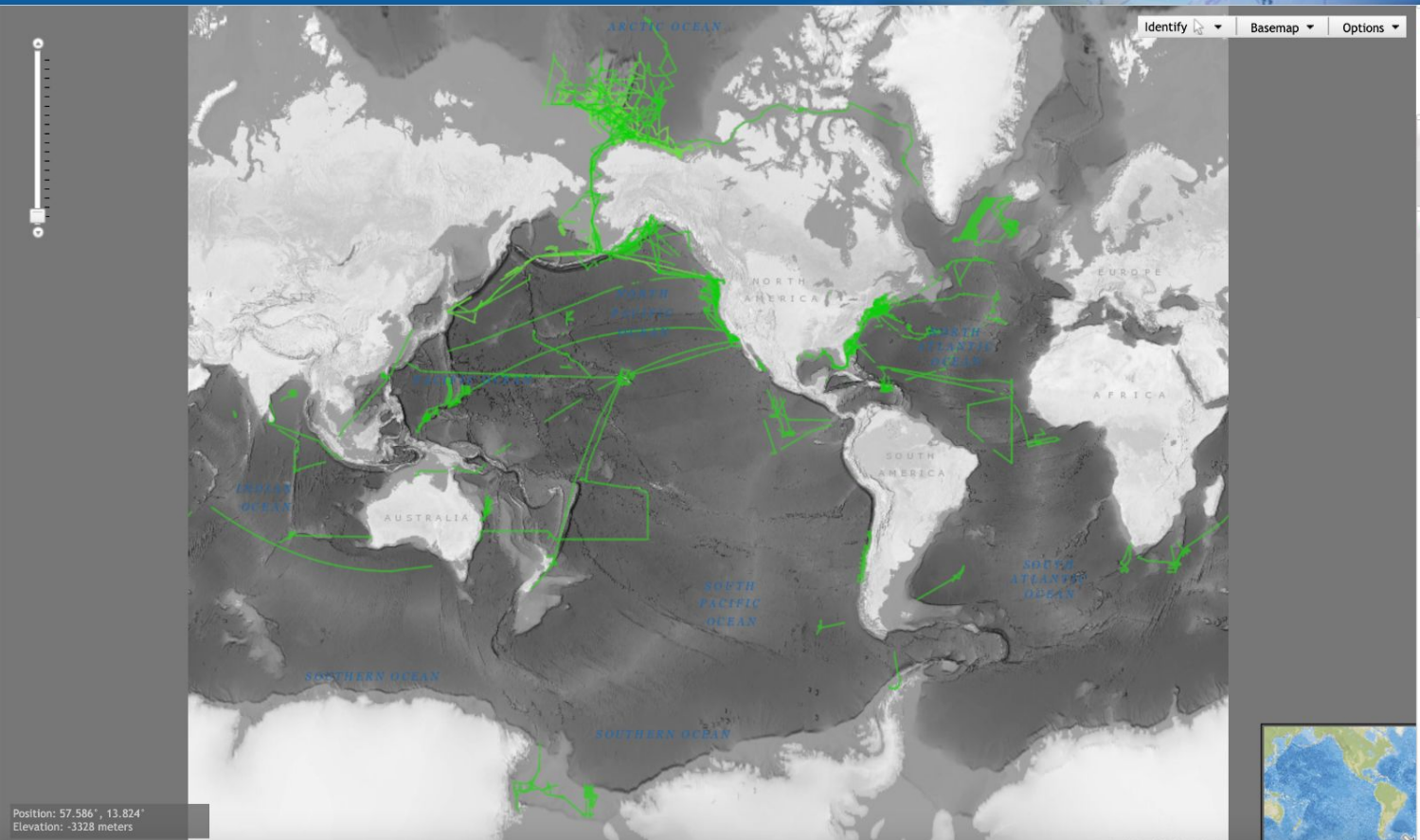
- Multibeam Surveys [?](#)
- Multibeam Survey Footprints [?](#)
- Multibeam Bathymetry Mosaic [?](#)
- Single-Beam Surveys [?](#)
- Single-Beam Sounding Density [?](#)
- NOAA Hydrographic Surveys: [?](#)
 - All Surveys with Digital Data
 - Surveys with BAGs
- BAG Shaded Relief Imagery [?](#)

[?](#)

Current filter:
Date Added: 2022-03-01-present

- Crowdsourced Bathymetry Files [?](#)
- [?](#)
- U.S. Bathymetry Coverage and Gap Analysis [?](#)

- EMODnet
- Australia
- Canada
- France
- Germany
- Japan
- Netherlands
- New Zealand
- Norway
- Portugal
- United Kingdom
- Other Data Sources
- Known Non-Public Data [?](#)
- Bathymetric Coverage Maps



- Mercator
- Arctic
- Antarctic



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New Multibeam Data Holdings

Data Centre for Digital Bathymetry Viewer

Layers

▼ IHO DCDB/NOAA NCEI ?

- Multibeam Surveys ?
- Multibeam Survey Footprints ?
- Multibeam Bathymetry Mosaic ?
- Single-Beam Surveys ?
- Single-Beam Sounding Density ?
- NOAA Hydrographic Surveys: ?
 - All Surveys with Digital Data
 - Surveys with BAGs
- BAG Shaded Relief Imagery ?

?

Current filter:
Date Added: 2022-03-01-present

- Crowdsourced Bathymetry Files ?
- ?
- U.S. Bathymetry Coverage and Gap Analysis ?

► EMODnet

► Australia

► Canada

► France

► Germany

► Japan

► Netherlands

► New Zealand

► Norway

► Portugal

► United Kingdom

► Other Data Sources

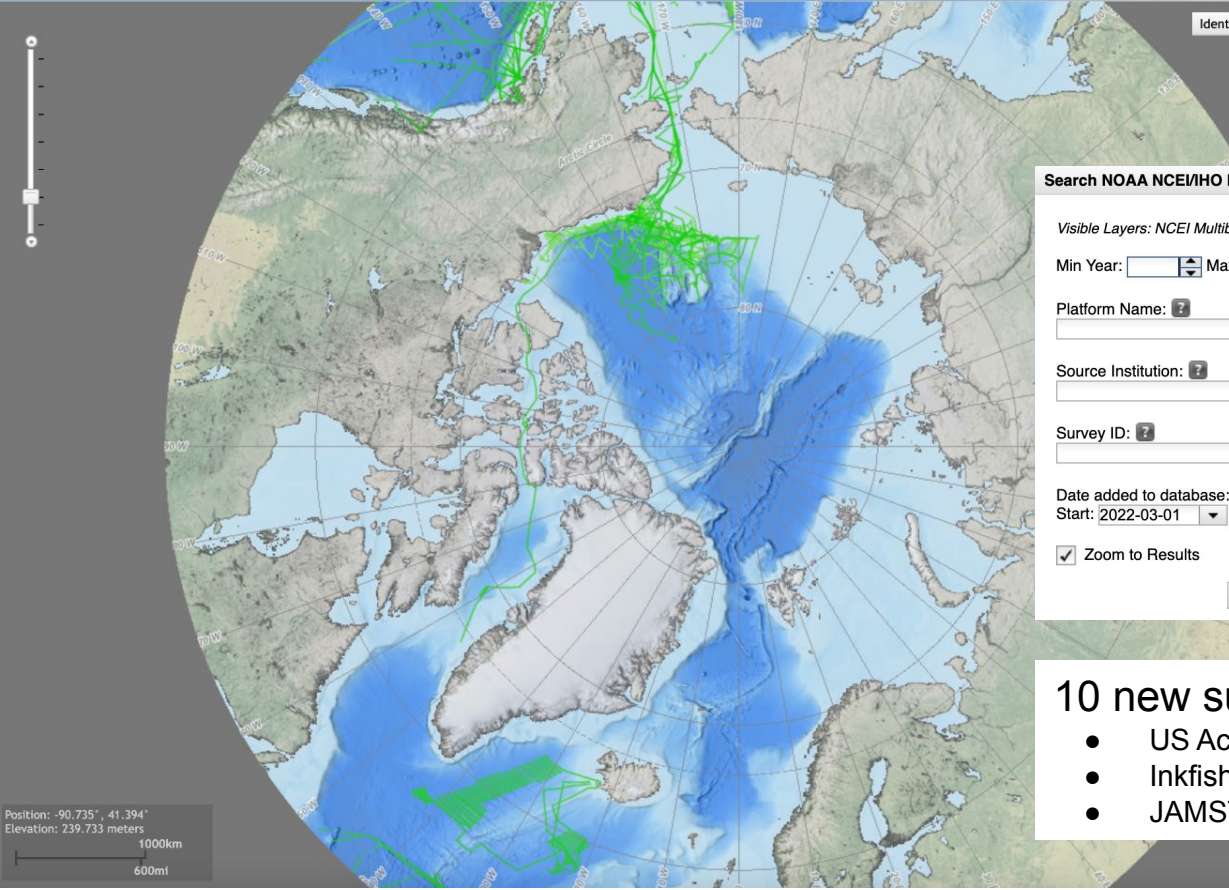
► Known Non-Public Data ?

► Bathymetric Coverage Maps

Grid Extract

More Information

Help



Identify ▼ Basemap ▼ Options ▼

Mercator
Arctic
Antarctic

Search NOAA NCEI/IHO DCDB Bathymetric Survey

Visible Layers: NCEI Multibeam

Min Year: Max Year:

Platform Name:

Source Institution:

Survey ID:

Date added to database:
Start: 2022-03-01 End:

Zoom to Results

10 new surveys

- US Academic Fleet
- Inkfish
- JAMSTEC

Note: Only IHO DCDB/NOAA NCEI layers are available in the Arctic and Antarctic map views.



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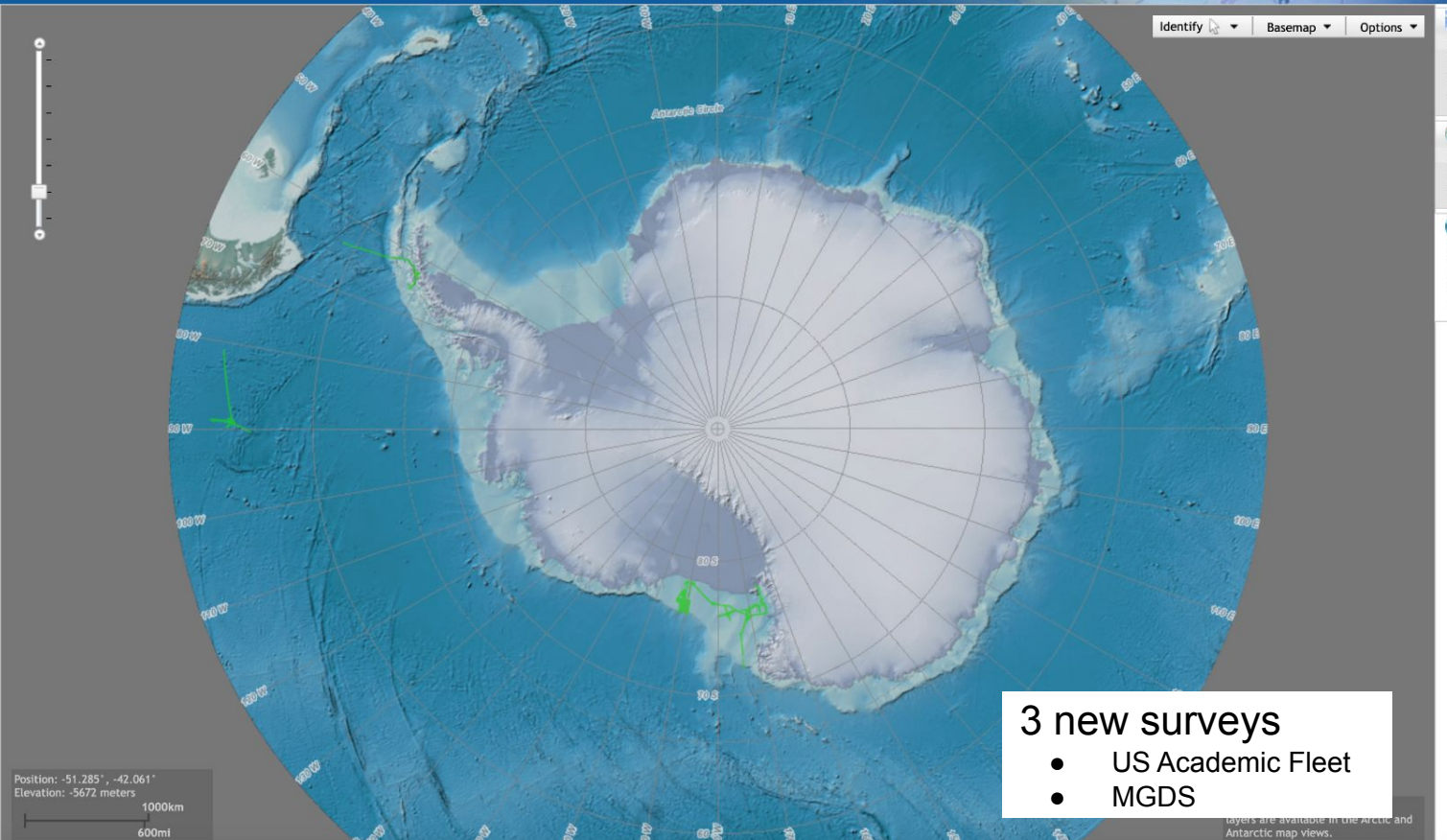
New Multibeam Data Holdings

Data Centre for Digital Bathymetry Viewer

Layers

- IHO DCDB/NOAA NCEI [?](#)
 - Multibeam Surveys [?](#)
 - Multibeam Survey Footprints [?](#)
 - Multibeam Bathymetry Mosaic [?](#)
 - Single-Beam Surveys [?](#)
 - Single-Beam Sounding Density [?](#)
 - NOAA Hydrographic Surveys: [?](#)
 - All Surveys with Digital Data
 - Surveys with BAGs
 - BAG Shaded Relief Imagery [?](#)
- [?](#)
- Current filter:**
Date Added: 2022-03-01-present
- Crowdsourced Bathymetry Files [?](#)
- [?](#)
- U.S. Bathymetry Coverage and Gap Analysis [?](#)
- EMODnet
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Grid Extract
 More Information
 Help



3 new surveys

- US Academic Fleet
- MGDS

layers are available in the Arctic and Antarctic map views.



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Data Holdings: Crowdsourced Bathymetry



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Layers

▼ IHO DCDB/NOAA NCEI ?

- Multibeam Surveys ?
- Multibeam Survey Footprints ?
- Multibeam Bathymetry Mosaic ?
- Single-Beam Surveys ?
- Single-Beam Sounding Density ?
- NOAA Hydrographic Surveys: ?
 - All Surveys with Digital Data
 - Surveys with BAGs
- BAG Shaded Relief Imagery ?

Search NCEI/DCDB Surveys X Reset ?

Crowdsourced Bathymetry Files ?

Search CSB Files X Reset ?

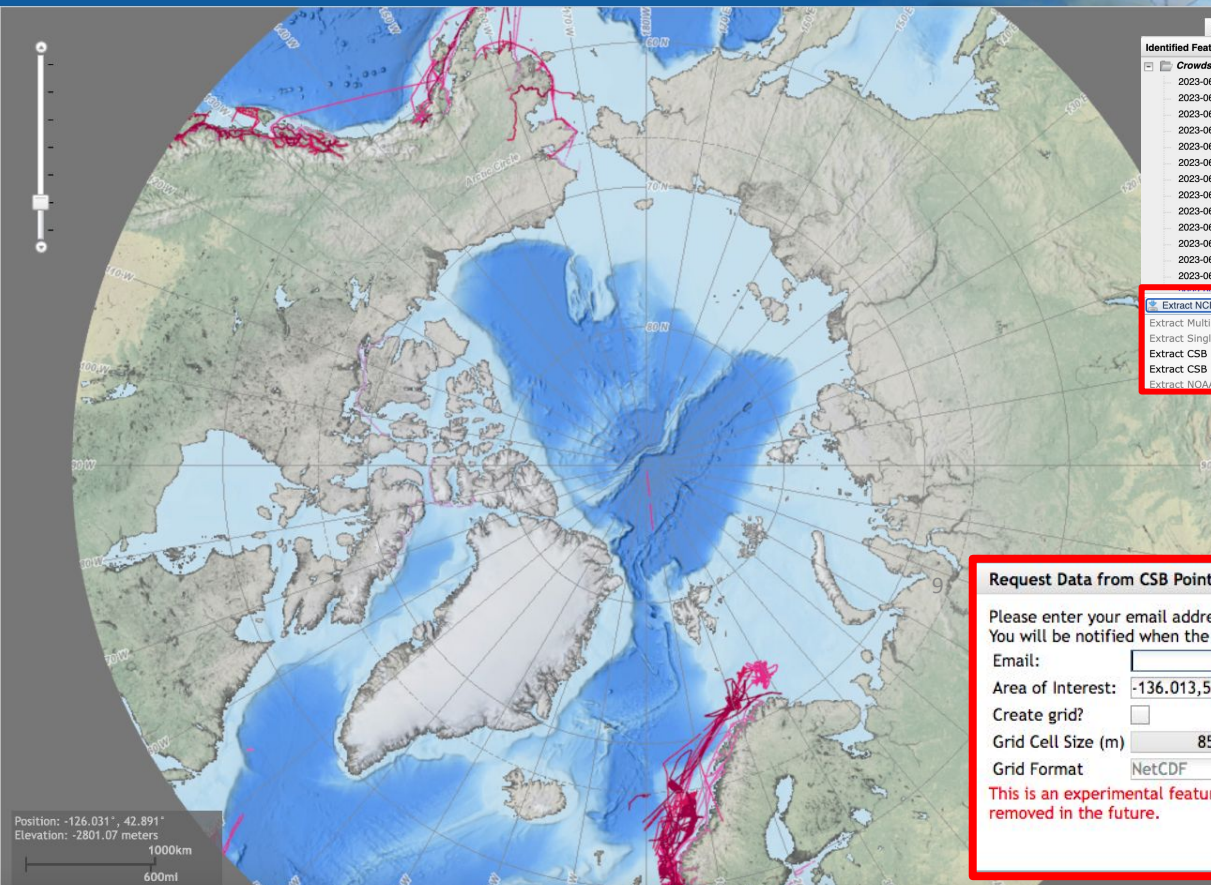
U.S. Bathymetry Coverage and Gap Analysis ?

- EMODnet
- Australia
- Canada
- France
- Germany
- Japan
- Netherlands
- New Zealand
- Norway
- Portugal
- United Kingdom
- Other Data Sources
- Known Non-Public Data ?
- Bathymetric Coverage Maps

Grid Extract

More Information

Help



Identify Basemap Options

Identified Features (31)

- ▼ Crowdsourced Bathymetry Files (31)
 - 2023-06-04T17:59 - 2023-06-04T18:59
 - 2023-06-04T17:00 - 2023-06-04T17:59
 - 2023-06-04T16:00 - 2023-06-04T16:59
 - 2023-06-04T15:00 - 2023-06-04T15:59
 - 2023-06-04T14:00 - 2023-06-04T14:59
 - 2023-06-04T13:00 - 2023-06-04T13:59
 - 2023-06-04T12:00 - 2023-06-04T12:59
 - 2023-06-04T11:00 - 2023-06-04T11:59
 - 2023-06-03T03:00 - 2023-06-03T03:59
 - 2023-06-03T02:00 - 2023-06-03T02:59
 - 2023-06-03T01:00 - 2023-06-03T01:59
 - 2023-06-03T00:00 - 2023-06-03T00:59
 - 2023-06-02T23:00 - 2023-06-02T23:59

Extract NCEI/DCDB Data

- Extract Multibeam Data
- Extract Single-Beam Data
- Extract CSB Data Files
- Extract CSB Point Store Data
- Extract NOAA Hydrographic Survey Data

Request Data from CSB Point Store

Please enter your email address to request these data. You will be notified when the file is ready.

Email:

Area of Interest:

Create grid?

Grid Cell Size (m)

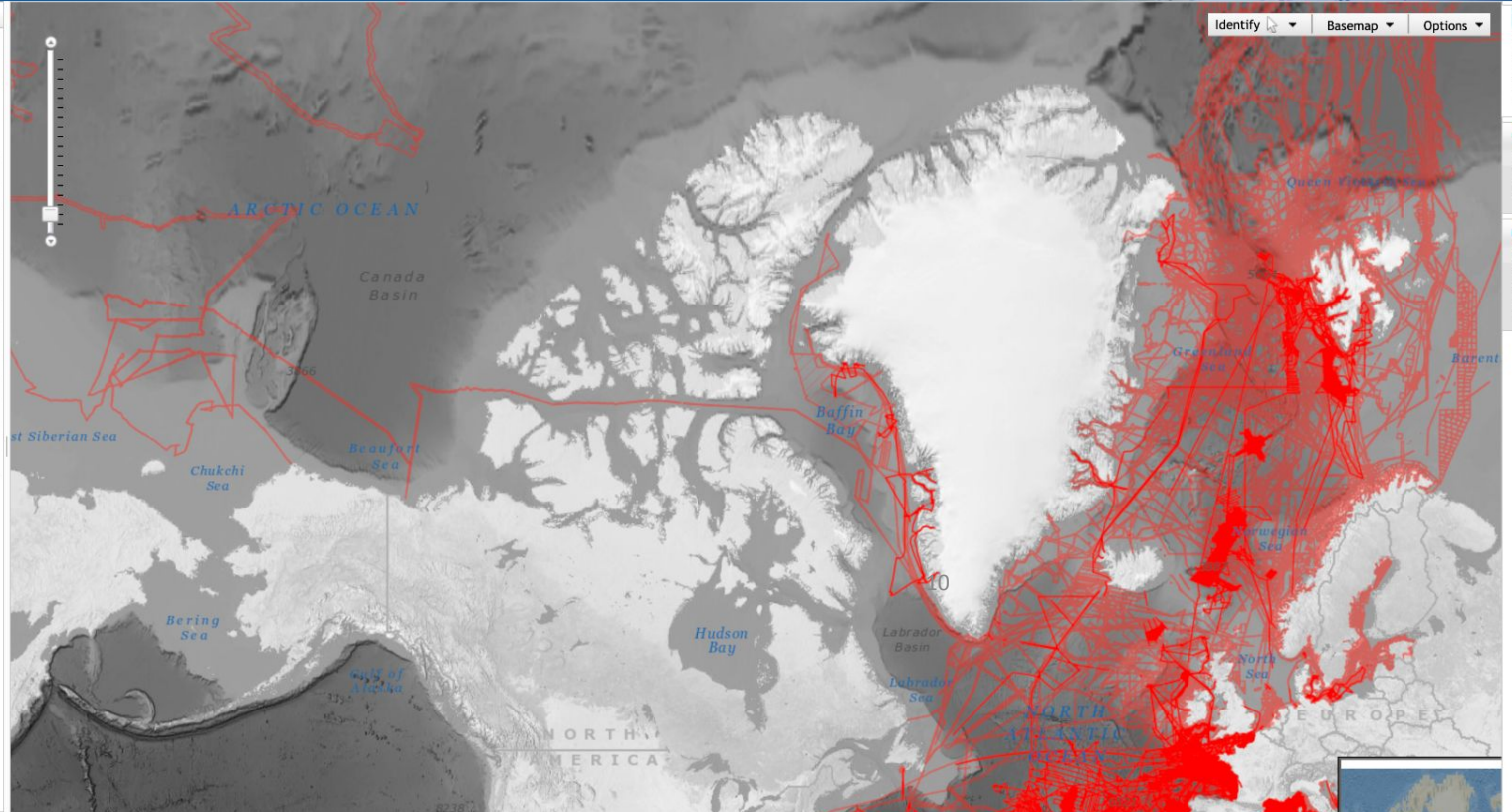
Grid Format

This is an experimental feature and may change or be removed in the future.

OK Cancel

Layers

- IHO DCDB/NOAA NCEI ?
- EMODnet
 - EMODnet Multibeam Surveys ?
 - EMODnet Single-Beam Surveys ?
 - EMODnet Digital Terrain Model (DTM) ?
- Australia
- Canada
- France
- Germany
- Japan
- Netherlands
- New Zealand
- Norway
- Portugal
- United Kingdom
- Other Data Sources
- Known Non-Public Data ?
- Bathymetric Coverage Maps



Identify Basemap Options

Mercator Arctic Antarctic

Grid Extract
More Information
Help

Position: 166.530°, 75.961°
Elevation: -77.056 meters





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DCDB Web Services

Data Centre for Digital Bathymetry Viewer



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Layers

- ▶ IHO DCDB/NOAA NCEI [?](#)
- ▶ EMODnet
- ▶ Australia
- ▶ Canada
- ▶ France
- ▼ Germany
 - AWI Processed Multibeam Data Coverages [?](#)
 - PANGAEA Multibeam Raw Data Footprints [?](#)
 - PANGAEA Multibeam Processed Data Footprints [?](#)
 - PANGAEA Multibeam Raw Data Bathymetry [?](#)
 - PANGAEA Multibeam Processed Data Bathymetry [?](#)
- ▶ Japan
- ▶ Netherlands
- ▶ New Zealand
- ▶ Norway
- ▶ Portugal
- ▶ United Kingdom
- ▶ Other Data Sources
- ▶ Known Non-Public Data [?](#)
- ▶ Bathymetric Coverage Maps

Grid Extract

More Information

Help



Position: -118.413°, -55.532°
Elevation: -3180 meters

Identify Basemap Options



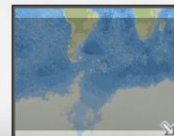
Mercator



Arctic



Antarctic





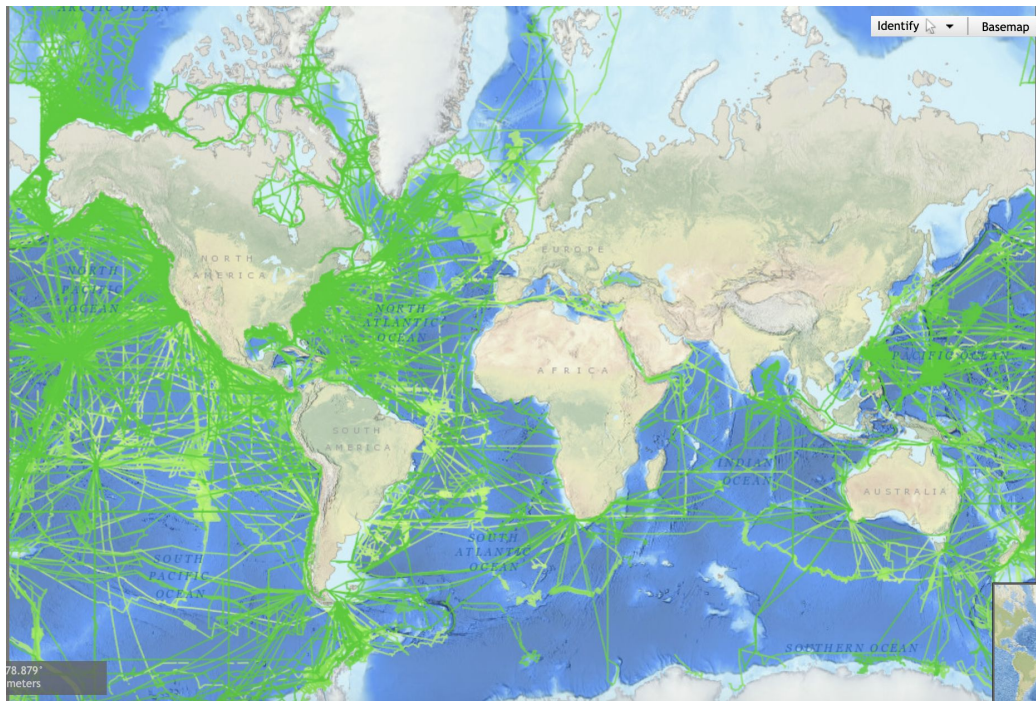
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Contributing Data to the DCDB

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The estimated global seafloor coverage held in the DCDB multibeam archive is calculated to be ~12%, compared to GEBCO 2023 grid at 24.9%.

DCDB data holdings are routinely harvested by Seabed 2030.



Discovery enables reuse of data ⇒ Reuse of data increases its value



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Data Submission Resources

International Hydrographic Organization

Data Submission Guidelines:

- ngdc.noaa.gov/iho/SubmittingMarineGeophysicalData.pdf

CruisePack Software:

- ngdc.noaa.gov/mgg/cruisepack/

GEBCO Data Contribution Form:

- gebcoscience.org/about-us/contributing_data/

DCDB Data Managers:

- mb.info@noaa.gov
- georgianna.zelenak@noaa.gov

IHO DCDB Home
Contribute Data
Crowdsourced Bathymetry
CSB Mapping Projects

How to Contribute Data to the IHO DCDB

Contact bathydata@iho.int for more information on contributing data or sharing web services to the IHO DCDB.
Refer to [Submitting Marine Geophysical Data to the IHO DCDB](#) for how to package and submit data.

Governments, organizations, academia, industry and individuals are encouraged to contribute data to the IHO DCDB.

Bathymetric data and metadata can be submitted via File Transfer Protocol (FTP), email, or mail (hard drive) in the formats listed below.

- **Raw sonar data:** MGD77T or the original manufacturer's format
- **Processed data:** gsf, BAG, NetCDF, tiff, xyz, sd, asc, etc.
- **Metadata:** XML or text

Other formats and products will be considered on a case-by-case basis.

Learn more about contributing [crowdsourced bathymetry](#).

IHO Member States are invited to provide sounding data extracted from their Electronic Navigational Charts (ENC). Only soundings from ENC cells in navigational purpose bands 2 and 3 are requested. For more information, please refer to [IHO Circular Letter 11/2016](#).

Data contributors → Data uses

The diagram shows a central yellow box with the IHO logo and text: "IHO Data Centre for Digital Bathymetry (DCDB)". Arrows point from "Data contributors" on the left to this central box, and from the central box to "Data uses" on the right. Contributors include Government, Industry, Academia, International Projects, Crowd sourced Bathymetry, and Others. Data uses include Hydrographic Offices, GEBCO Products, Regional Mapping, Web Applications, International Agencies, and Others.

CruisePack Software

The screenshot shows the CruisePack software interface with a form for submitting bathymetry data. It includes fields for "Multibeam Bathymetry", "Path to Data File", "Public Release Date", and "Add Data Comments". There are buttons for "Add", "Processed", and "Products".

NOAA NCEI is developing and testing *CruisePack*, a data packaging and metadata gathering software tool that simplifies how a data provider collects and submits cruise-based data. *CruisePack* features a simple user interface to control packager operation and facilitate metadata entry. Once the user completes metadata entry, data packaging is automatic. *CruisePack* copies the data, generates machine-parseable JSON metadata records and creates a checksum manifest file; all contained in a structured data package conforming to the BagIt specification.

CruisePack aims to meet a growing community need to submit geophysical data efficiently and in a consistent format. [Learn more and download CruisePack.](#)

ngdc.noaa.gov/iho/



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Additional DCDB Activities

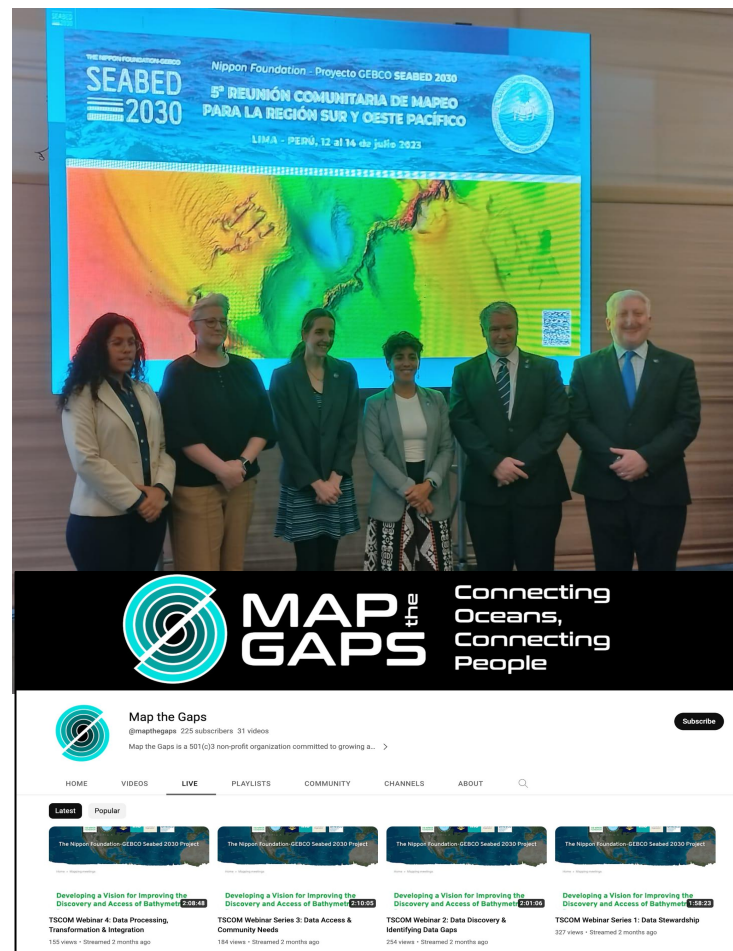
International

SB2030 S & W Pac Regional Mapping Meeting & Workshop

- Workshop focused on training communities on open-source tools and data.
- Provided overview of DCDB data discovery, access, and tools. Included overnight archiving of data collected during workshop.

Developing a Vision for Improving the Discovery and Access of Bathymetric Data - **Webinar Series & Working Meeting**

- Series of live webinars and a hybrid working meeting focused on complementary aspects of the data life cycle related to (1) Data Sharing & Archiving, (2) Data Discovery & Data Gaps, (3) Data Processing & Integration and (4) Metadata Enhancements
- Discussions centered around developing inclusive and equitable strategies to improve discovery and access of bathymetric data.



youtube.com/@mapthegaps/streams



Crowdsourced Bathymetry

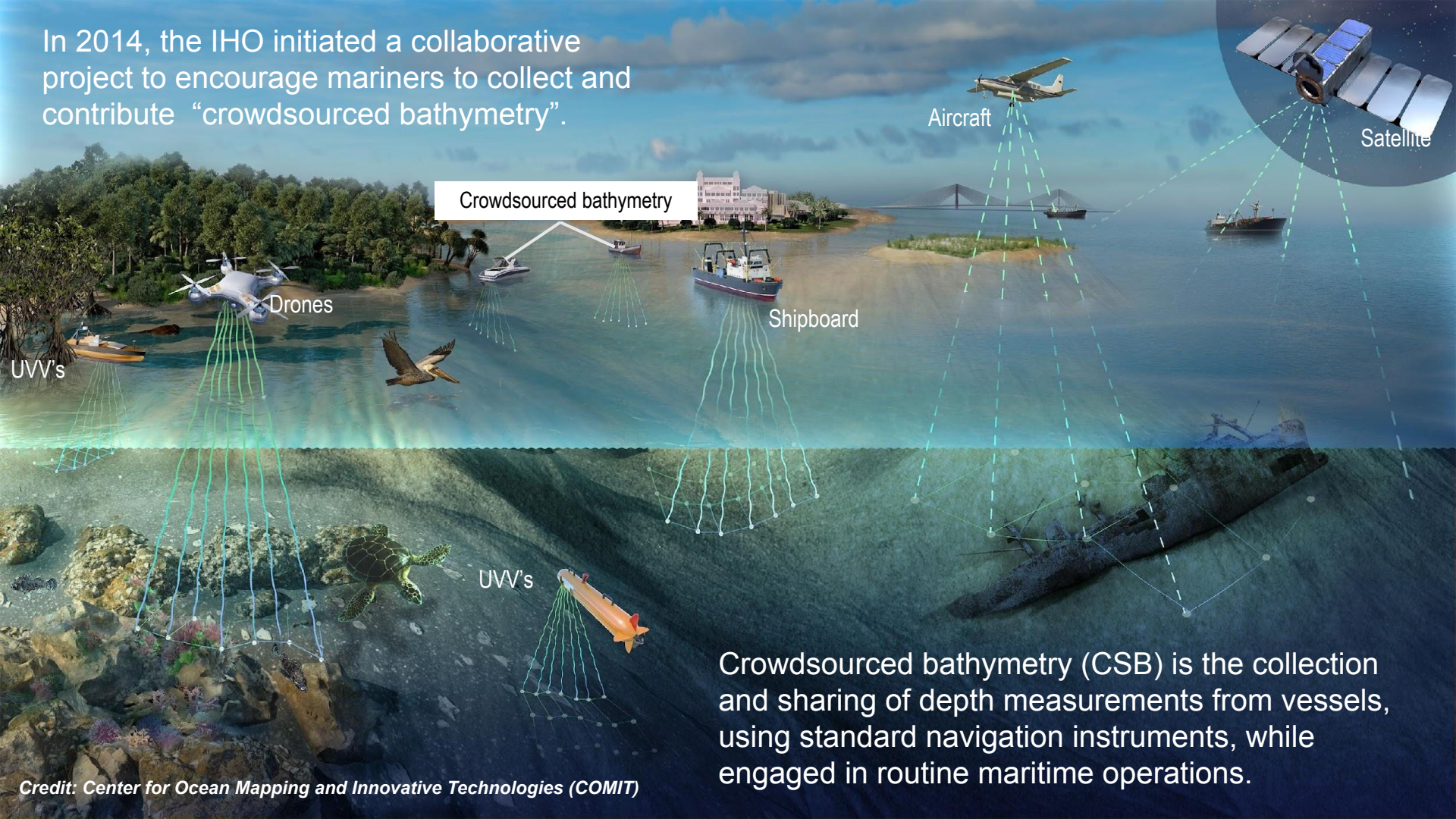


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Fifth Arctic-Antarctic and North Pacific Mapping Meeting - November 7, 2023

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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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, 34 coastal States (**green**) have replied positively*



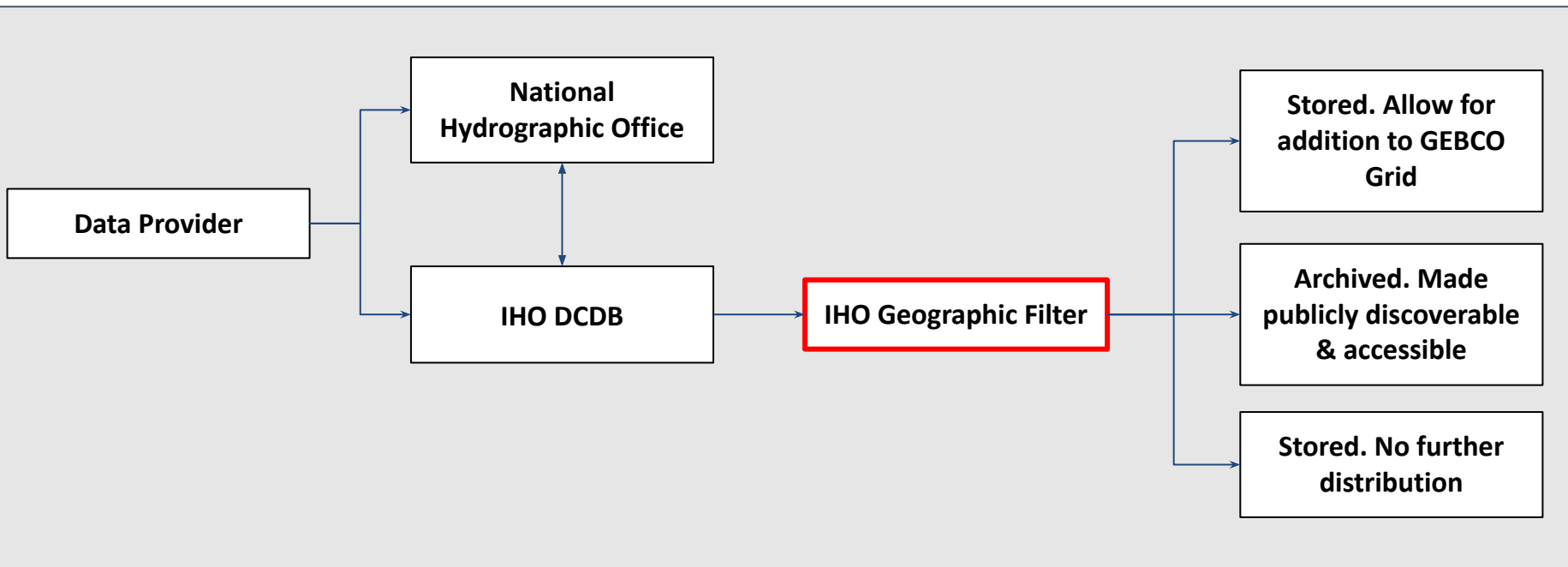


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Geographic Filter

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In response to feedback provided to the IHO, the 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.

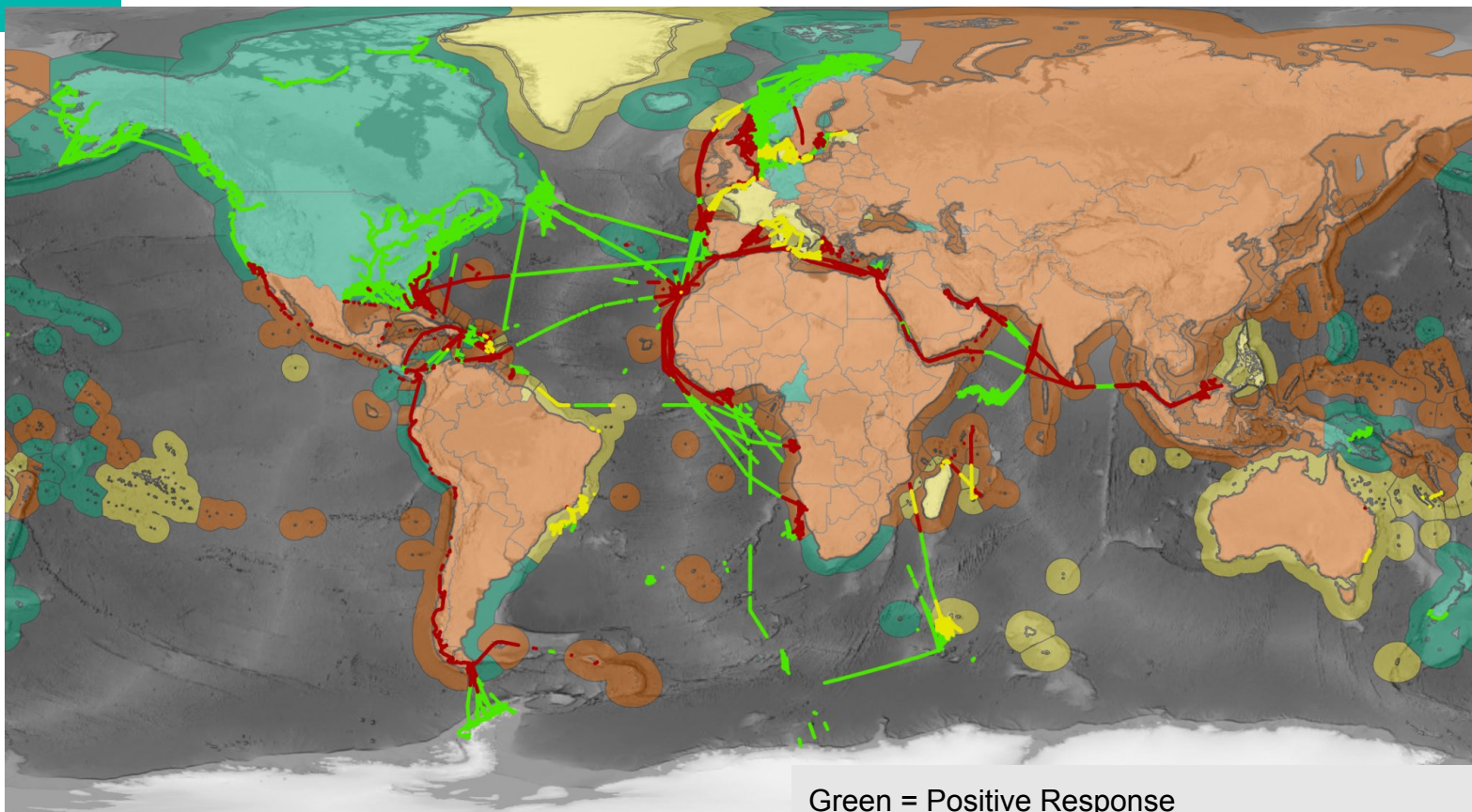




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Geographic Filtering

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Green = Positive Response
Yellow = Positive Response w/ caveats unable to adhere to
Red = Negative Response, No Response

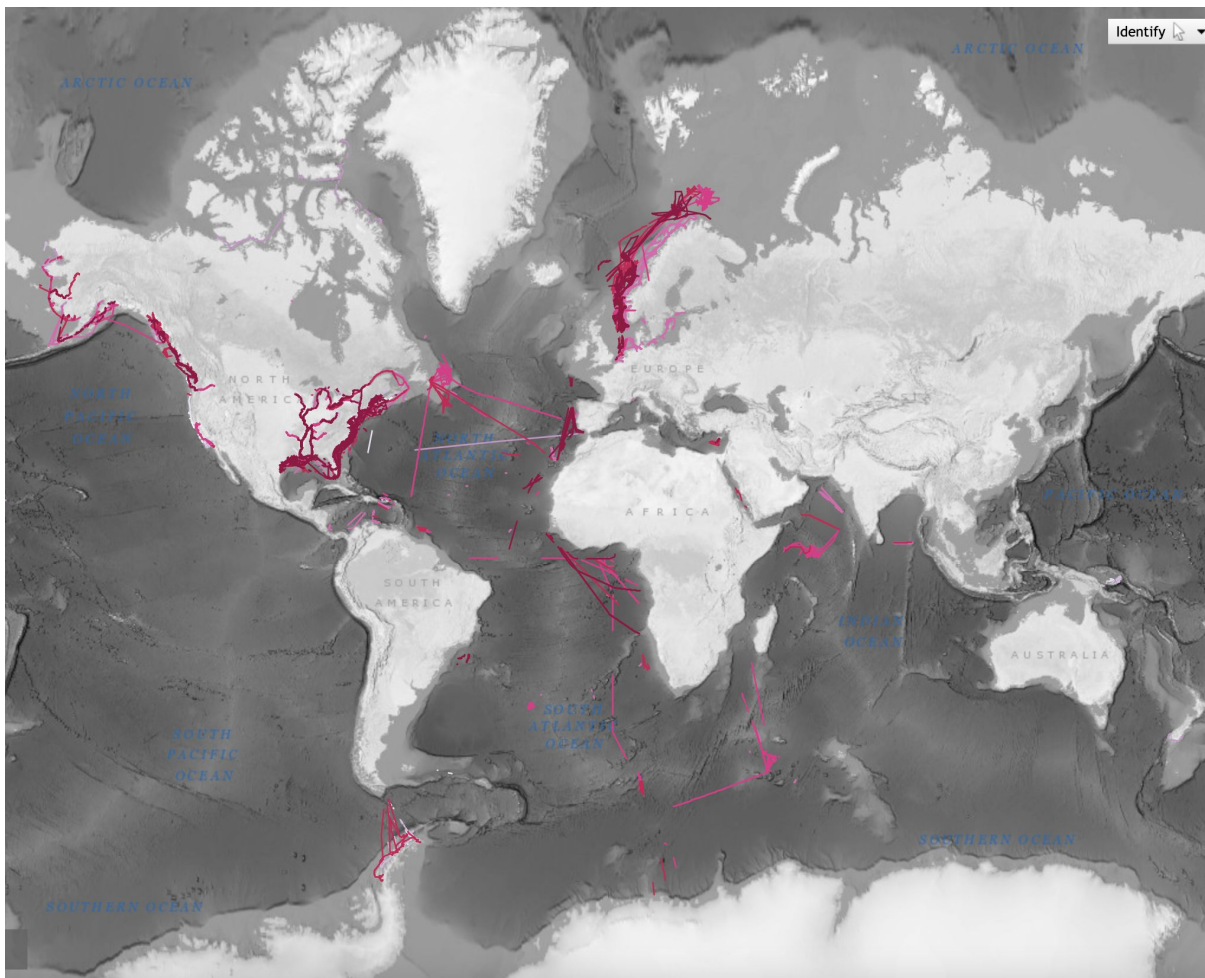
Map for illustrative purposes only. (Credit: Marine Regions)



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CSB Data Holdings

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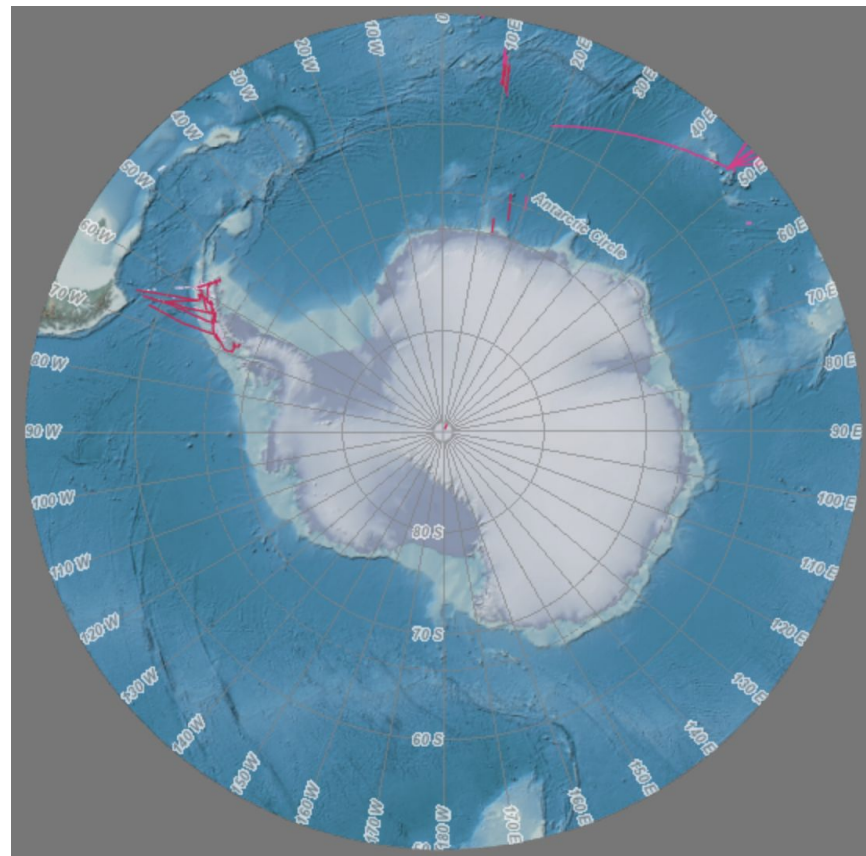
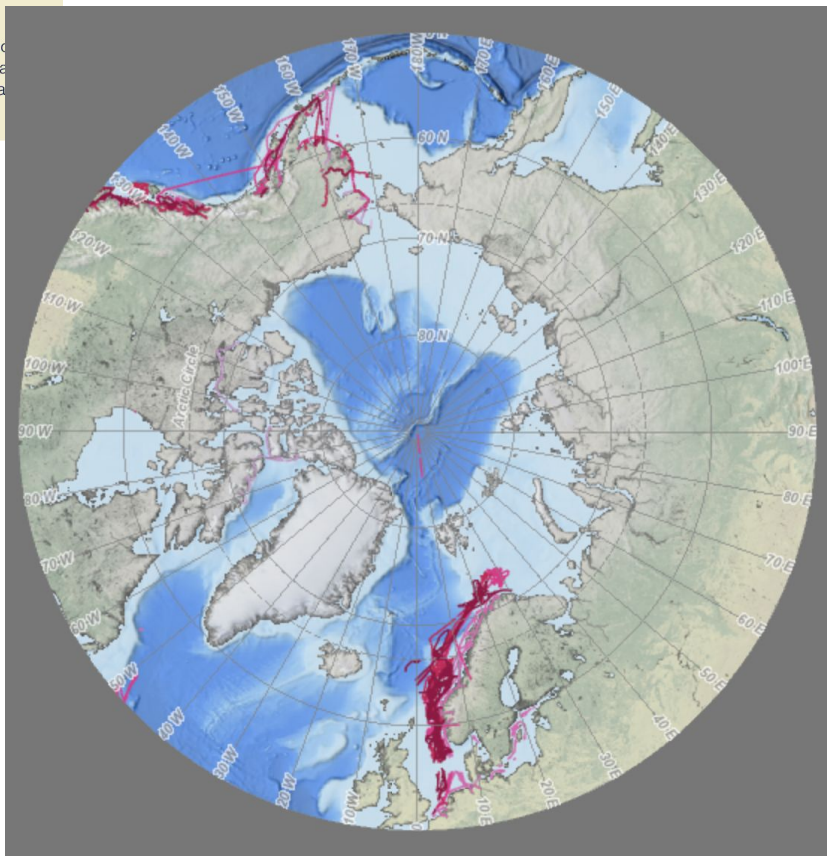




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CSB Data Holdings - Regional

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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.

Many thanks to the Danish, French and Australian Hydrographic Offices who have assisted in testing this new feature.

Home Manage Username: Chris Slater Log Out

Search Areas [Search CSB Data](#)

Search

[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	<input checked="" type="checkbox"/> Change	MACGR-9221566-AIDAAURA-oyHjp01	MacGregor	Anonymous		2020-03-28T03:08:33Z	2020-03-28T03:10:16Z	20220322085844674039_9221566-AIDAAURA-oyHjp01.tar.gz	965	2022-03-28T21:17:48.738516Z
000042ca-d435-4d84-aea4-ec04163d4dc2	<input checked="" type="checkbox"/> Change	MACGR-9221566-AIDAAURA-oyHjp01	MacGregor	Anonymous		2020-04-29T03:00:32Z	2020-04-29T03:02:36Z	20220322083434750180_9221566-AIDAAURA-oyHjp01.tar.gz	798	2022-03-28T15:16:03.354039Z



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CSB Working Group Meetings

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- **Meetings:** CSBWG 13: January 2023, hosted by NOAA in Boulder, Colorado, U.S.A.; CSBWG 14: August 2023, hosted by Norway HO in Stavanger, Norway
- **Chair:** Jennifer Jencks, USA; **Vice Chair:** Peter Wills, Canada
- **Representatives from 18 Member States:** Canada, China, Denmark, France, Germany, India, Iran, 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 Gama Maritime Ltd, Dock Tech, ECC AS, FarSounder, FLIR Systems AB, Fugro, Great Lakes Observing System (GLOS), H2i, James Cook U, OrangeForce Marine, Seabed 2030, Sea-ID, SevenCs/ChartWorld, Teledyne CARIS





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The IHO Crowdsourced Bathymetry Initiative

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The Working Group was formed and tasked to develop ***B-12 IHO Guidance on Crowdsourced Bathymetry*** that states the IHO's policy towards, and best practices for, the collection and contribution of CSB.

Edition 3.0.0 was published in October 2022.

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).

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

B-12 Edition 3.0.0





IHO

New Work Items

- A. Maintain and update IHO CSB Guidance Document (B-12)
- B. Submit IHO CSB initiative as a UN Decade Action
- C. Gather, prioritize and respond to HO-specific issues/opportunities regarding national policy/regulations related to CSB
- D. Gather and prioritize HO-specific issues relating to CSB data, including but not limited to Nautical Cartography
- E. Support CSB/SB2030 Coordinators in their RHC engagement
- F. Discuss and propose potential software tool support for HOs
- G. Clarify support identified by current Trusted Nodes needed for current and future Trusted Nodes.
- H. Clarify all aspects of the CSB data cycle and capture known issues, requirements and suggested enhancements.
 - I. Develop a communication plan in coordination and collaboration with related efforts (SB2030, GEBCO, etc)
- J. Develop a recognition & incentive strategy plan



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CSBWG14 Highlights - Crowd the Bay Program

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Phased pilot in Tampa Bay with an eye towards a sustained, diverse crowdsourced bathymetry program in coastal Florida.





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CSBWG14 Highlights - SeaID Nemo 30 Data Logger

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- NEMO 30 data logger that connects to the ships GPS and echosounder
- Versatility to plug into a range of onboard systems and to upload data to the cloud ⇒ minimising operator input and maximising access to collected data





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Interested in participating in CSB?

Ask questions!

Spread the word.

Determine local interest in participating.

- If there is potential interest, determine the best way to promote participation in the collection and collaboration of CSB data.

Determine how your community can become involved.

Options include:

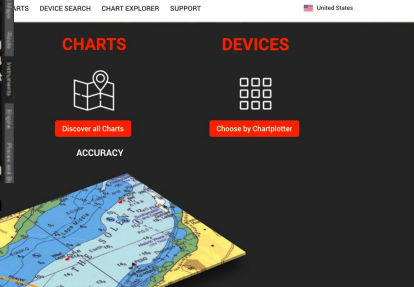
- Utilizing participating navigation software systems (eg: Rosepoint, Navico-CMAP, AquaMap)
- Utilization of Voyage Data Recorders for larger seagoing vessels
- Installation of data loggers



SmartLog USB data logger



www.rosepointnav.com



Talk to Seabed 2030 about potential funding opportunities for logger distributions



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CSBWG - Up Next

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Hydrographic
Organization

1. CSBWG Intersessional December 13, VTC
2. CSBWG15 currently planned for mid-March, location TBD



<https://iho.int/en/csbwg>

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Thank you.

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