



# IHO Data Centre for Digital Bathymetry

Report to IRCC15

Tokyo, Japan  
12 – 14 June 2023

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## 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 \(NOAA\)](#) 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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Hydrographic  
Organization

[ngdc.noaa.gov/iho/](https://ngdc.noaa.gov/iho/)



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# DCDB Data Holdings

## Multibeam Bathymetry Data Holdings

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The screenshot displays the 'Data Centre for Digital Bathymetry Viewer' interface. The main map shows a world map with green lines representing bathymetry data. The left sidebar contains a 'Layers' panel with the following options:

- 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 options include 'Search NCEI/DCDB Surveys', 'Search CSB Files', and 'U.S. Bathymetry Coverage and Gap Analysis'. The 'EMODnet' section is expanded, showing 'Australia', 'Canada', and 'France'. The bottom left of the map area displays coordinates: Position: 12.192°, 62.748° and Elevation: 891.852 meters.

Archive includes raw and processed multibeam bathymetry data, survey metadata, and supporting ancillary data and products for some surveys.

Contains over 3,800 surveys spanning 43 years.

58 different data sources.

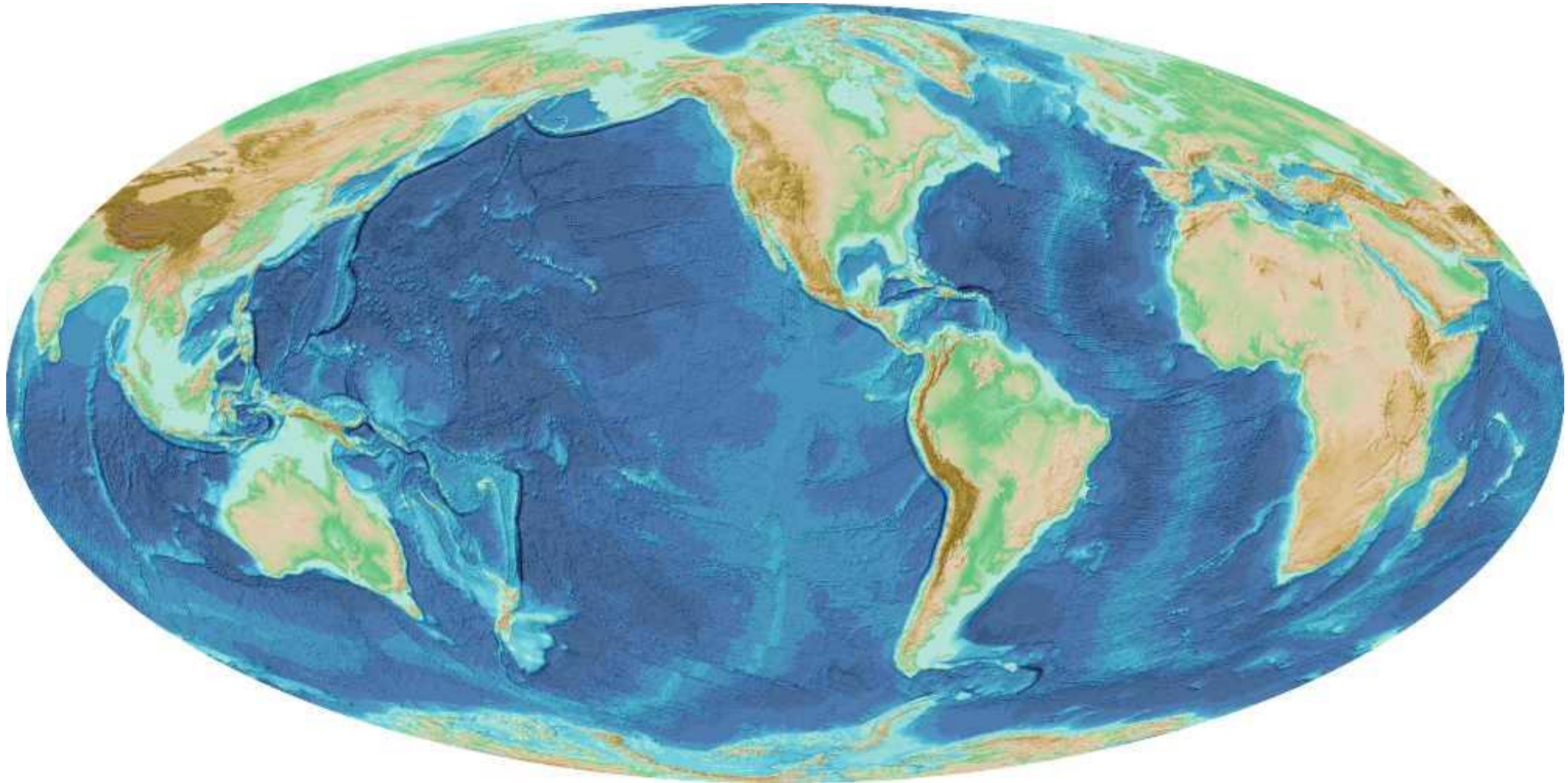
Total size: ~66 TB uncompressed.



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**DCDB Data Holdings** ⇒ **GEBCO Products**

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GEBCO 2023 grid = 24.9% of seafloor mapped

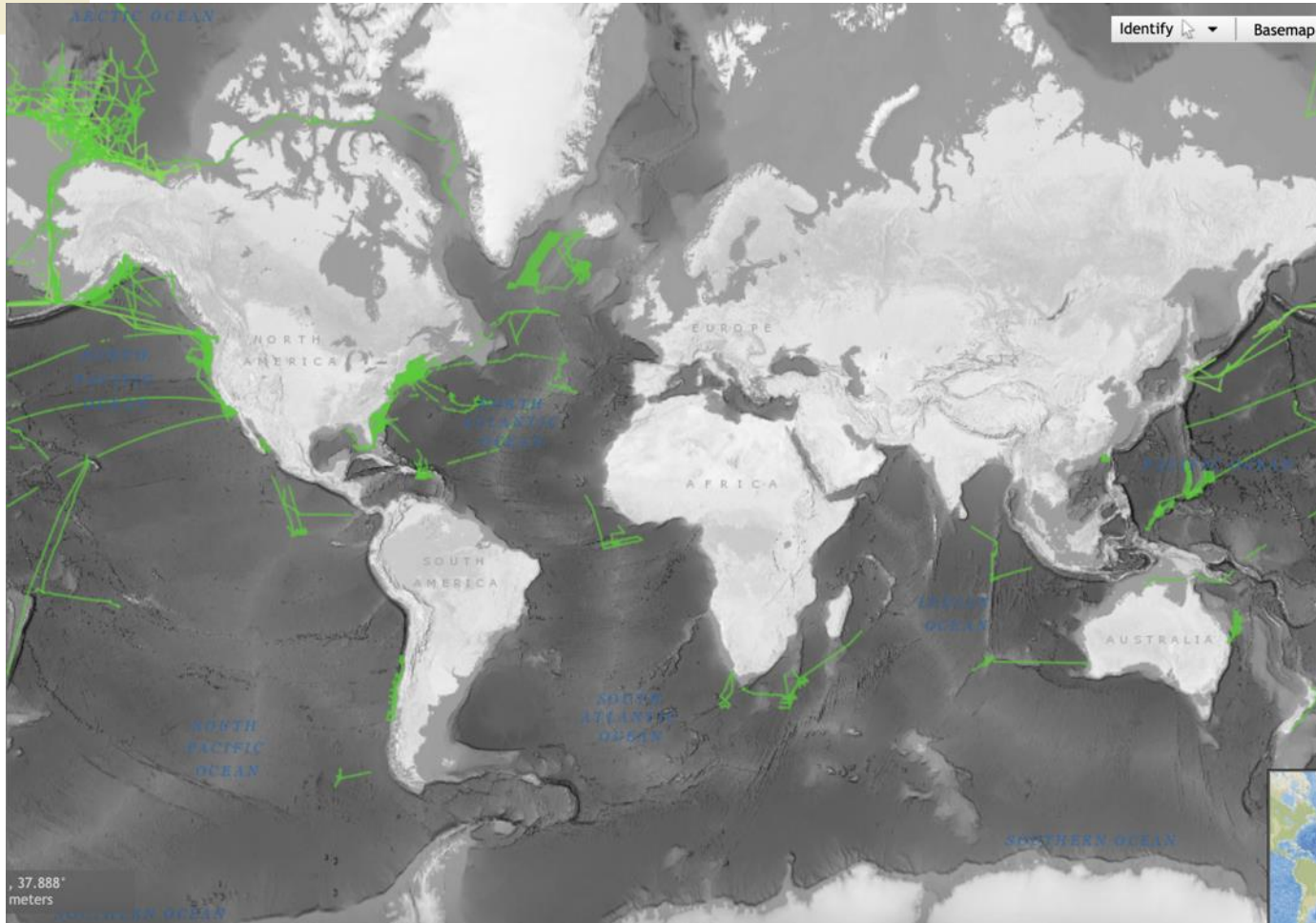


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# DCDB Data Holdings

Multibeam Bathymetry Data Contributions in 2022/23 - [127 NEW surveys](#)

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**U.S. Academic Research Fleet (ARF):** 60 surveys

**Fugro:** 12 surveys

**NOAA Fleet:** 51 surveys

**JAMSTEC:** 7 surveys

**Canadian Hydrographic Service:** 2 surveys

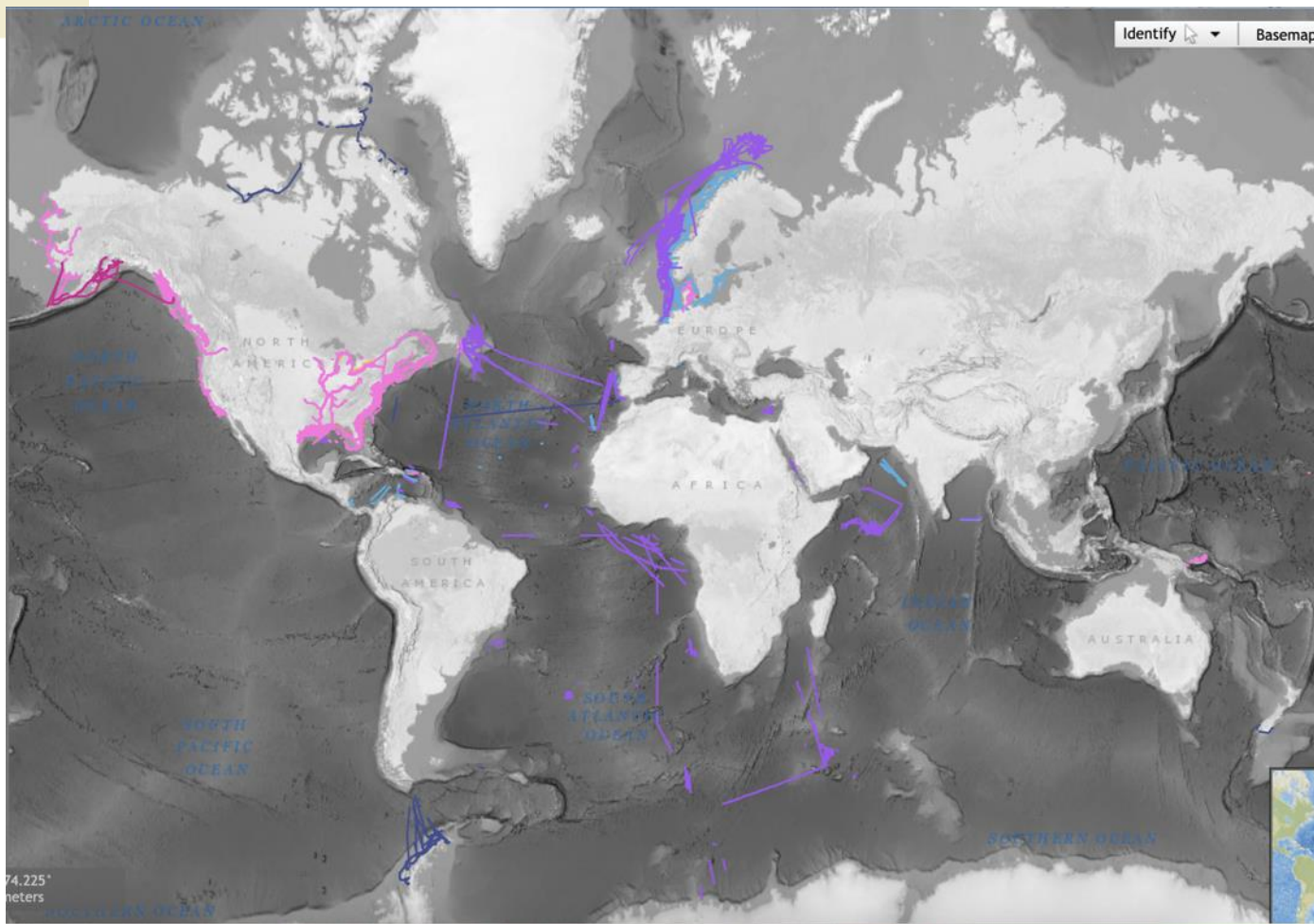


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# DCDB Data Holdings

## Crowdsourced Bathymetry

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**The DCDB continues to bring in CSB data from:**  
Rosepoint Navigation System, FarSounder Inc,  
PGS and MacGregor Germany.

**New CSB pipelines were finalized with:**  
M2Ocean, Great Lakes Observing System  
(GLOS), Orange Force Marine and GEC Aqua  
Map.

**Onboarding in process for:**  
The Interdisciplinary Center for Development in  
Ocean Mapping (CIDCO) and Seabed 2030



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# DCDB Map Viewer

Improvements and updates



## Data Centre for Digital Bathymetry Viewer

The screenshot shows the DCDB Map Viewer interface. On the left is a 'Layers' panel with the following options:

- 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
- Reset
- Crowdsourced Bathymetry Files
  - Search CSB Files
  - Reset
- U.S. Bathymetry Coverage and Gap Analysis
- EMODnet
- Australia
- Canada
- France
- Germany
- Japan
- Grid Extract
- More Information
- Help

The main map area displays bathymetry data as green lines over a world map. Labels for various regions are visible: USCHC\_Atlantic, MBSHC, EAiHC, MACHC, SEPRHC, and SWAiHC. A status bar at the bottom left shows 'Position: 41.786°, 45.815°' and 'Elevation: 67 meters'. The top right of the map area includes 'Identify', 'Basemap', and 'Options' menus. The map uses the Mercator projection.

- Web Services - Updates:**
- GEBCO basemap/contours - labels/text in viewer updated to GEBCO\_2022
  - Canada NONNA WMS URL
  - GEBCO\_2022 TID service
- Web Services - New:**
- Norway added: MAREANO moved from under EmodNet to be standalone.
  - Added IHO Regional Hydrographic Commission (RHC) boundaries
- Added DEPARTURE/ARRIVAL PORT for Multibeam Data popup**



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# DCDB Enhancements

Development of a coastal state pre-approval portal for CSB data.

International Hydrographic Organization

Testing underway for a notification and approval process of data for coastal states who have agreed to allow public access to CSB data collected within waters of their national jurisdiction, but requested pre-approval of data before the public distribution from DCDB.

The screenshot displays the DCDB web application interface. At the top, there is a navigation bar with 'Home' and 'Manage' links, and a user profile section for 'Chris Slater' with a 'Log Out' button. The main content area is split into two parts. On the left, there is a search interface with a 'Search Areas' tab and a 'Search CSB Data' button. Below this is a search input field with a dropdown menu and 'Search' and 'Clear' buttons. On the right, a map shows the French Exclusive Economic Zone (EEZ) with a green bounding box around a specific area. A 'Layer Chooser' button is visible above the map. A data popup window titled 'French Exclusive Economic Zone' is overlaid on the map, displaying the following metadata:

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

Below the map is a data table with the following columns: Trace Id, Publish, External Id, Provider, Platform, Instrument, Start Time, End Time, File Name, File Size, and Last Updated. The table contains two rows of data:

Trace Id	Publish	External Id	Provider	Platform	Instrument	Start Time	End Time	File Name	File Size	Last Updated
000033e4-759c-4591-af98-04c29f6b967b	true <a href="#">Change</a>	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-ae4-ec04163d4dc2	true <a href="#">Change</a>	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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# DCDB Enhancements

## Development of a “CSB Pointstore Dashboard”

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Report Date: 2023-05-14

Total Count: 905,966,250

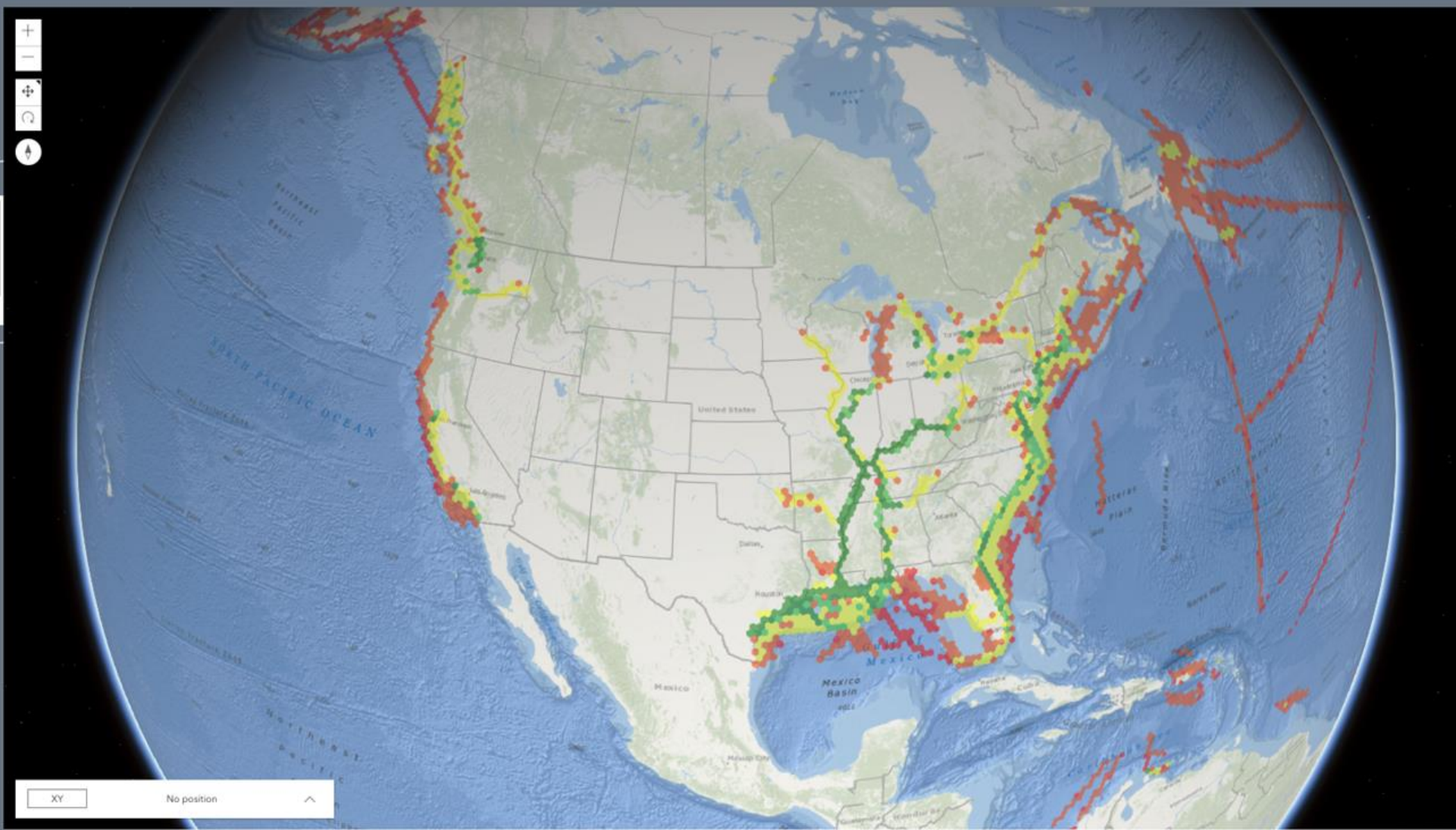
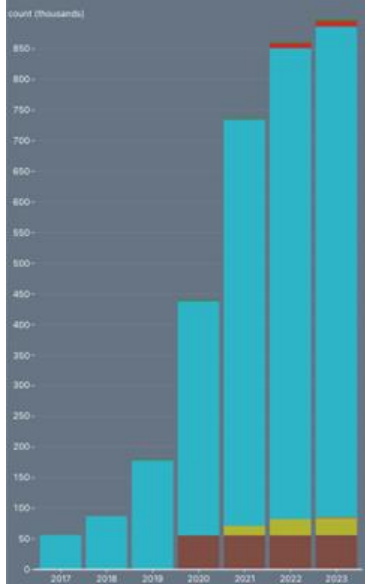
Archive Dates:  
2017-04-25 to 2023-05-13

6 orders in the last 30 days

### Providers

Rosepoint	806,901,847 (89%)
MacGregor	55,344,300 (6%)
PGS	28,342,506 (3%)
GLOS	9,020,058 (1%)
AquaMap	2,985,809 (<1%)
FarSounder	2,778,223 (<1%)
Orange Force Marine	303,896 (<1%)
Anonymous	146,633 (<1%)

### Archive Growth





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# DCDB Enhancements

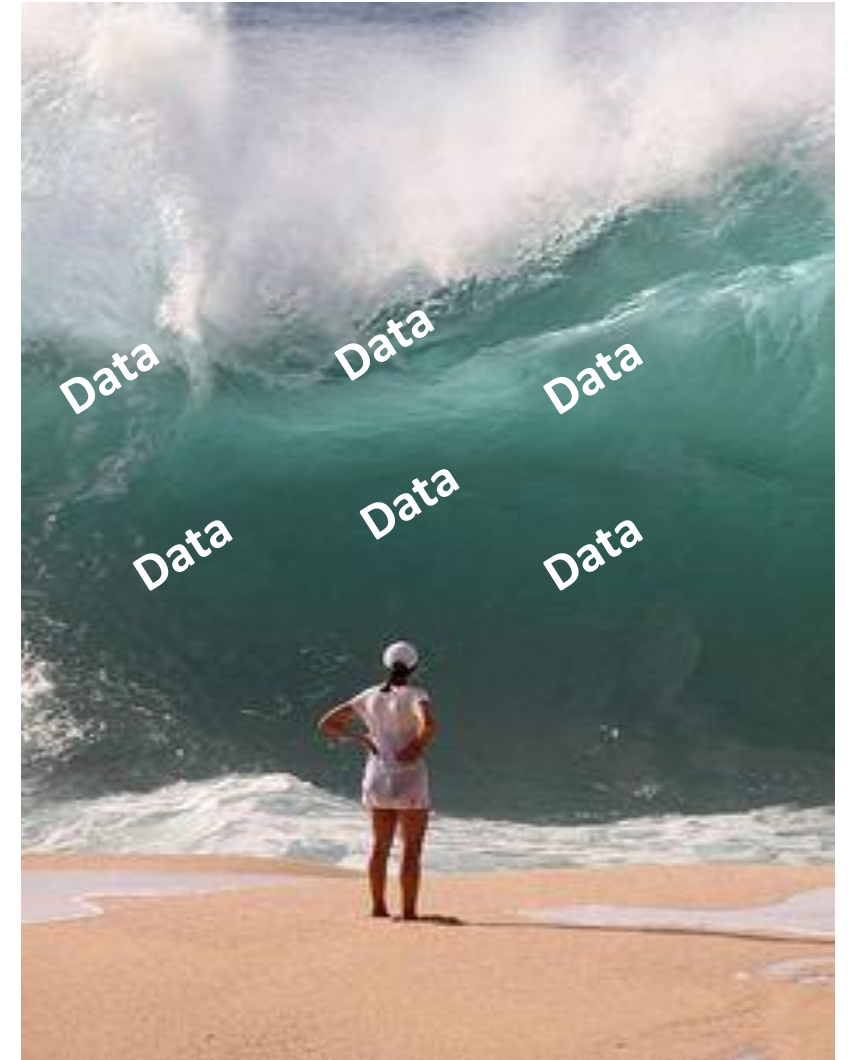
## Preparing for the Wave of Data

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Data submitted to the DCDB is formatted into our **database schema**, and then goes through our **data ingest pipeline** to get archived and published to the DCDB Data Viewer.

We are redesigning both the schema and pipeline! Our new ingest infrastructure will:

- Increase automation
- Improve efficiency
- Provide error handling & notification
- Have greater flexibility for evolving bathymetric technology
- Better handle complex datasets and large volumes of data
- Be cloud ready





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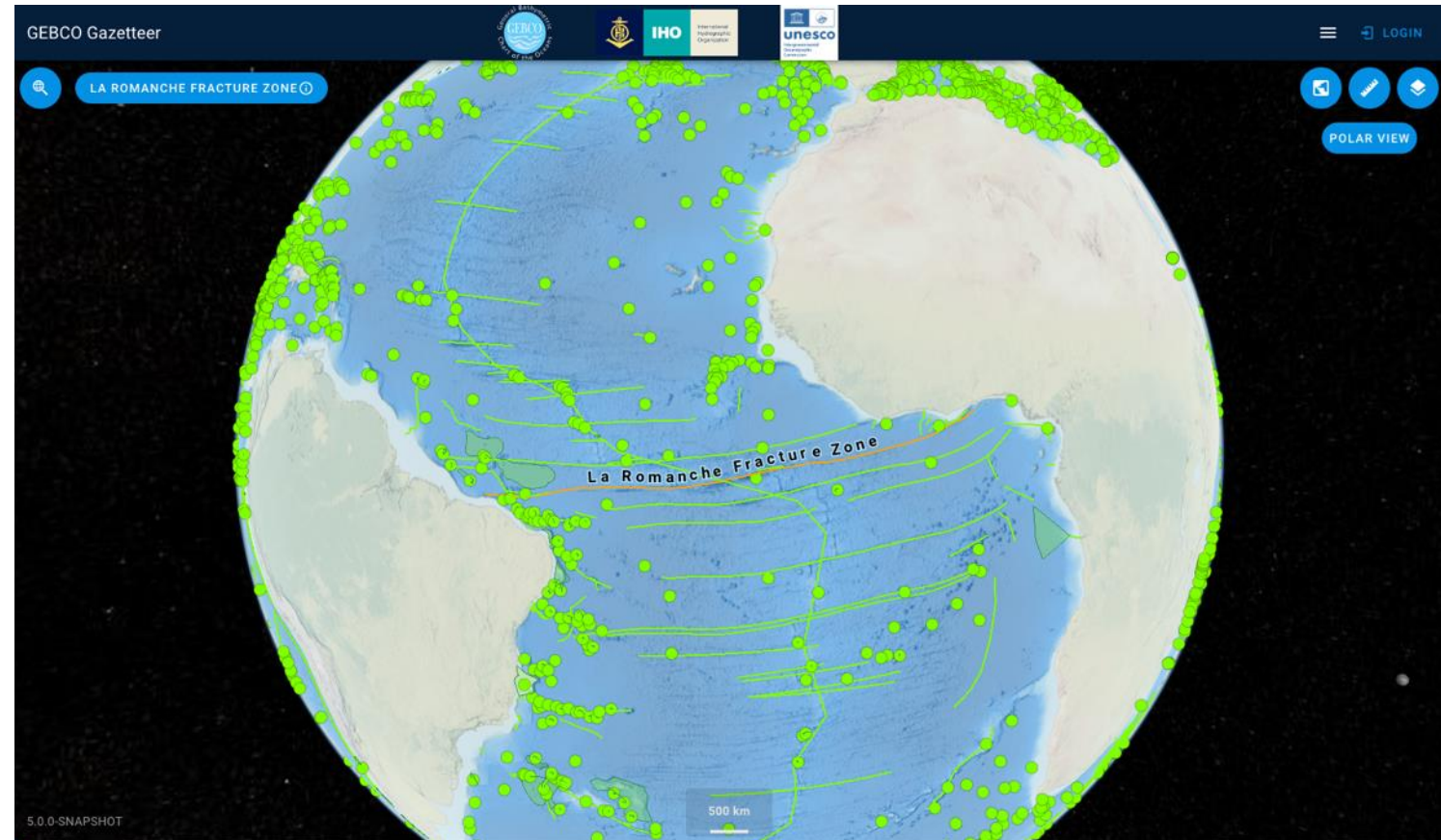
# GEBCO Gazetteer

A web tool that allows the public to search for, view, and download information on more than 3800 undersea features.

## Goals for 2023 work include:

- Continue to support the GEBCO Gazetteer and KHOA Beta-Gazetteer interoperation (Gazetteer v5.0.0)
- Update the API, fixing reported bugs and adding requested enhancements
- In-depth testing
- ***Developing a modern user interface with Vue.js and Google Material Design***

[ngdc.noaa.gov/gazetteer](https://ngdc.noaa.gov/gazetteer)





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# **Progress on IRCC Actions - IHO Annual Report**

## **Action 15**

DCDB to investigate how to report on SPIs 3.2.1 and 3.2.2. in a way that allows the perception on the evolution on the amount of data and number of contributors to DCDB who are not hydrographic offices.

- **SPI 3.2.1: Amount of data received per year by the IHO Data Centre for Digital Bathymetry (DCDB).**
- **SPI 3.2.2: Number of contributors to DCDB who are not hydrographic offices.**

Figures reported to the Secretariat in January 2023, to populate the part of 2022 IHO Annual Report dedicated to the IHO Strategic Plan 2021-2026.

### **SINGLEBEAM BATHYMETRY**

1. In 2022, a total of 177 datasets/surveys were contributed to the DCDB's singlebeam data holdings.
2. Of those 177 datasets/surveys, 10 were contributed by hydrographic offices.
3. HO contributions currently make up 17% of the DCDB's singlebeam data holdings.

### **MULTIBEAM BATHYMETRY**

1. In 2022, a total of 198 datasets/surveys were contributed to the DCDB's multibeam data holdings.
2. Of those 198 datasets/surveys, 0 were contributed by hydrographic offices.
3. HO contributions currently make up 0% of the DCDB's multibeam data holdings.

### **CROWDSOURCED BATHYMETRY**

1. In 2022, four new data providers began contributing data to the DCDB's CSB data holdings.
2. Of those four new data providers, 0 were hydrographic offices.
3. HOs currently make up 0% of the DCDB's CSB data providers.



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# Progress on IRCC Actions - ARHC Report to IRCC

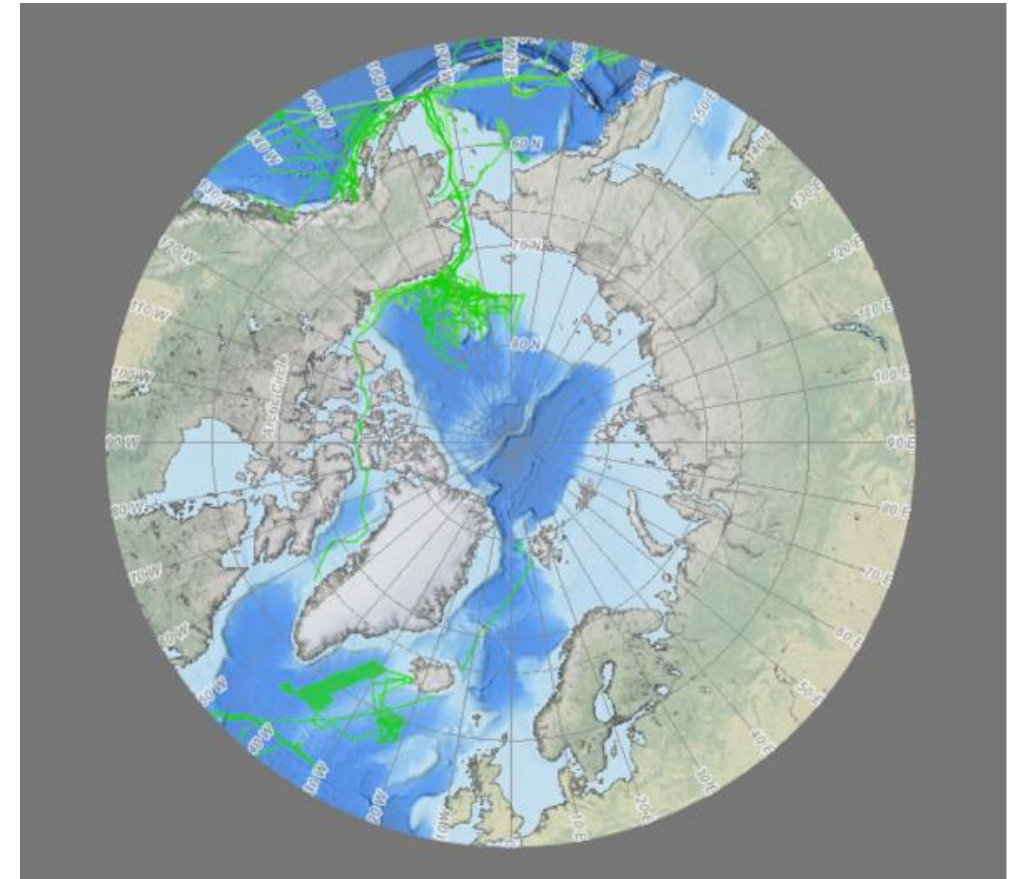
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DCDB to investigate how to report on SPIs 3.2.1 and 3.2.2. in a way that allows the perception on the evolution on the amount of data and number of contributors to DCDB who are not hydrographic offices.

***IRCC14/Recommendation 12: RHC to encourage Member States to release datasets or subsets into the public domain via the IHO DCDB.***

**Ongoing. Nearly 30 surveys from the ARHC region were added to the DCDB database since June 2022. Data contributors include: U.S. Academic Fleet (10), Caladan Oceanic LLC (1), National Oceanic and Atmospheric Administration (1), U.S. Coast Guard (8), Japan Agency for Marine-Earth Science and Technology (6).**

*Figure 1: Multibeam bathymetry data added to the IHO DCDB database between June 2022-present.*





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# Progress on IRCC Actions - ARHC Report to IRCC

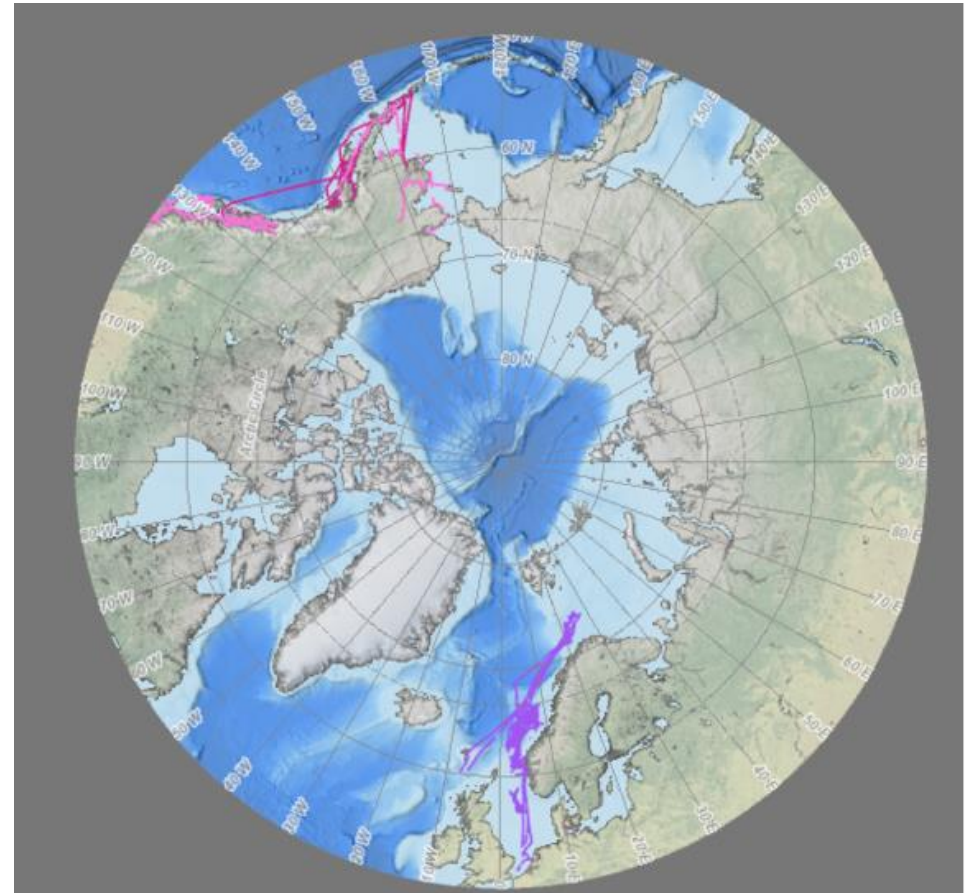
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*IRCC14/Recommendation 13: RHC to encourage Member States to support the CSB initiative with positive actions...*

Ongoing. New data continues to be recorded in the region by Petroleum Geo-Services (PGS) and users of Rosepoint's Coastal Explorer software. These data, when collected within the waters of Canada, Denmark, Norway, U.S., Finland, Iceland and Italy, are able to be made publicly discoverable after the DCDB addresses the caveats captured in IHO CL 21/2020.

*Figure 2: Crowdsourced bathymetry data added to the IHO DCDB database between June 2022-present.*





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# Any Other Items of Note

## SPI Reporting

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Last year, this report stated the intent of the DCDB in future years would be to produce regional breakdowns of data holdings using RHC limits as part of SPI reporting.

This was not accomplished in 2022 but will be a priority in 2023 and 2024.



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# Any Other Items of Note

## Memorandum of Understanding Signed

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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 Dr. Mathias Jonas and Rear Admiral Benjamin Evans







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# Conclusions and Recommended Actions

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It is highlighted that the DCDB is an IHO Member States' resource that requires additional data to increase the coverage and move towards a comprehensive global bathymetric dataset.

Therefore IHO Member States and stakeholders are ***invited to contribute and encourage the provision of bathymetric data regardless of its origin or reason for gathering.***



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# Actions Requested of IRCC

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- a) Note the contents of this report;
- b) Encourage Member State and stakeholder bathymetric data contributions to the DCDB, regardless of origin;
- c) Encourage RHC Chairs to collaborate with the DCDB on developing and highlighting annual regional breakdowns of data holdings as part of SPI reporting.
- d) Take any other action it considers appropriate.