IHO Data Center for Digital Bathymetry

An update

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IHO International Hydrographic Organization

23rd - 25th April 2024
Monaco

IHO CSB Working Group 15

Today's Talk

International Hydrographic Organization

The Role of the DCDB

Data Providers and Metrics

Data Access and Discovery

Recent Improvements

Ongoing and Planned Enhancements

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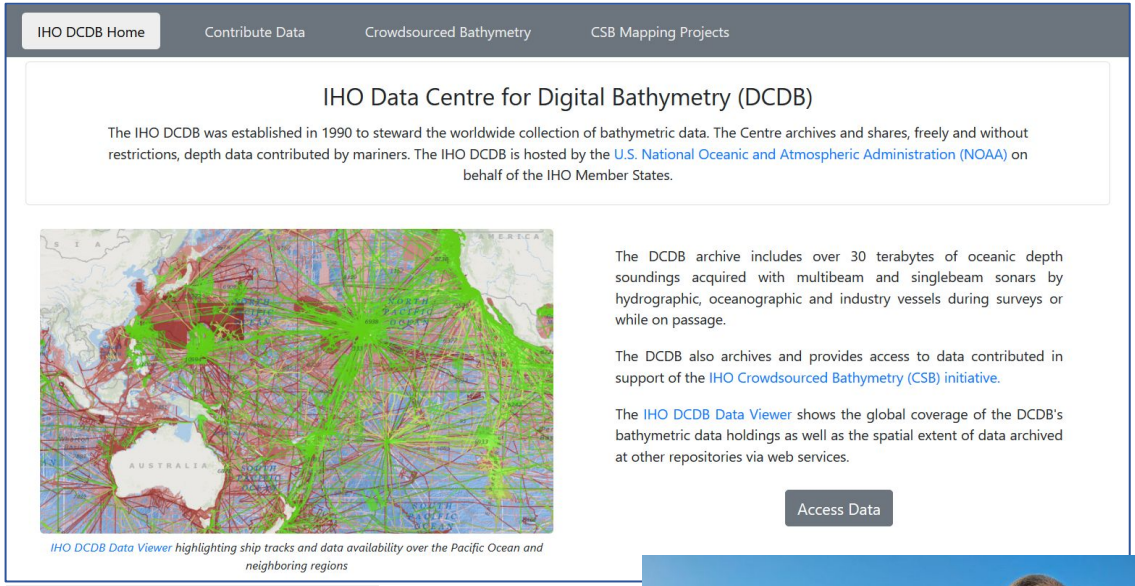
- The IHO DCDB is the recognized IHO repository for all ocean bathymetric data.
- Data are sent to the IHO DCDB, where we provide preservation, discovery and access.
- NOAA has hosted the DCDB since 1990.
- ***May 2023: An MOU was signed to reaffirm NOAA's relationship with the IHO as the host of the IHO DCDB***



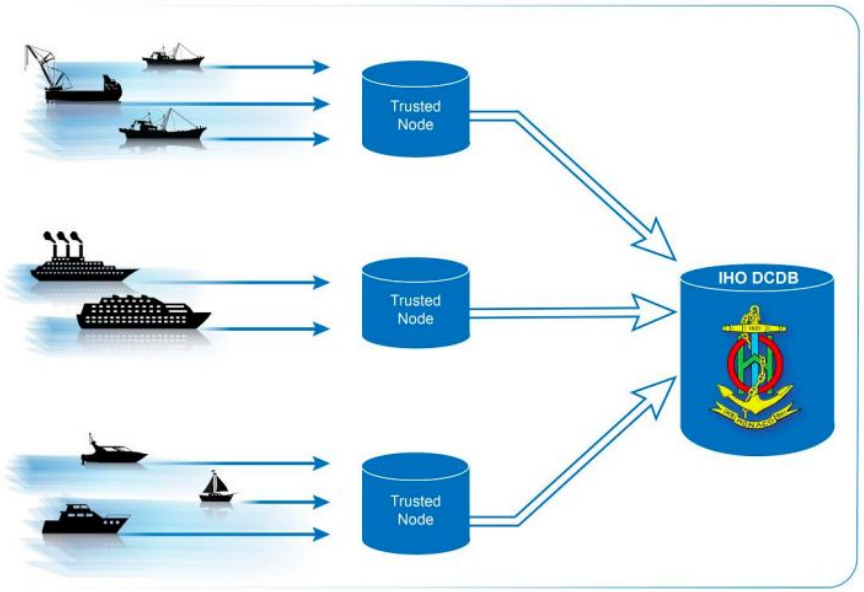
IHO DCDB Data Viewer highlighting ship tracks and data availability over the Pacific Ocean and neighboring regions

ngdc.noaa.gov/iho/

During the IHO Assembly, the signing of the MoU was recognized by Dr. Mathias Jonas and RDML Ben Evans

CSB Data Flow (Ideal Scenario)

The DCDB accepts CSB contributions through a network of "**Trusted Nodes**"



CSB Data Flow (Ideal Scenario)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            "value": 4326
        },
        "vertical": "Transducer"
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        "email": "support@example.com",
        "logger": "Rose Point ECS",
        "loggerVersion": "1.0"
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        }
    }
}
```


CSB data log file (with JSON metadata string)


```
                                                    2020-02-25T01:08:06Z
                                                    2020-02-25T01:08:07Z
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68.498213, 15.833567, 55.3, 2020-02-25T01:08:23Z
68.49815, 15.833622, 55.3, 2020-02-25T01:08:24Z
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68.497399, 15.834287, 53.3, 2020-02-25T01:08:35Z
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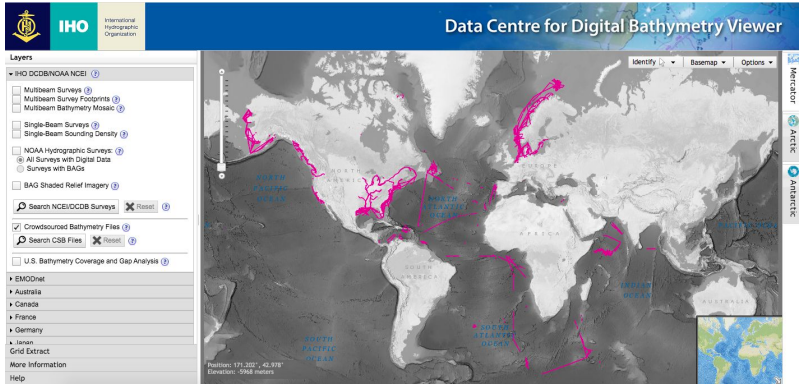
68.496143, 15.835387, 53.3, 2020-02-25T01:08:55Z
```


Data discovery and access via map viewer.

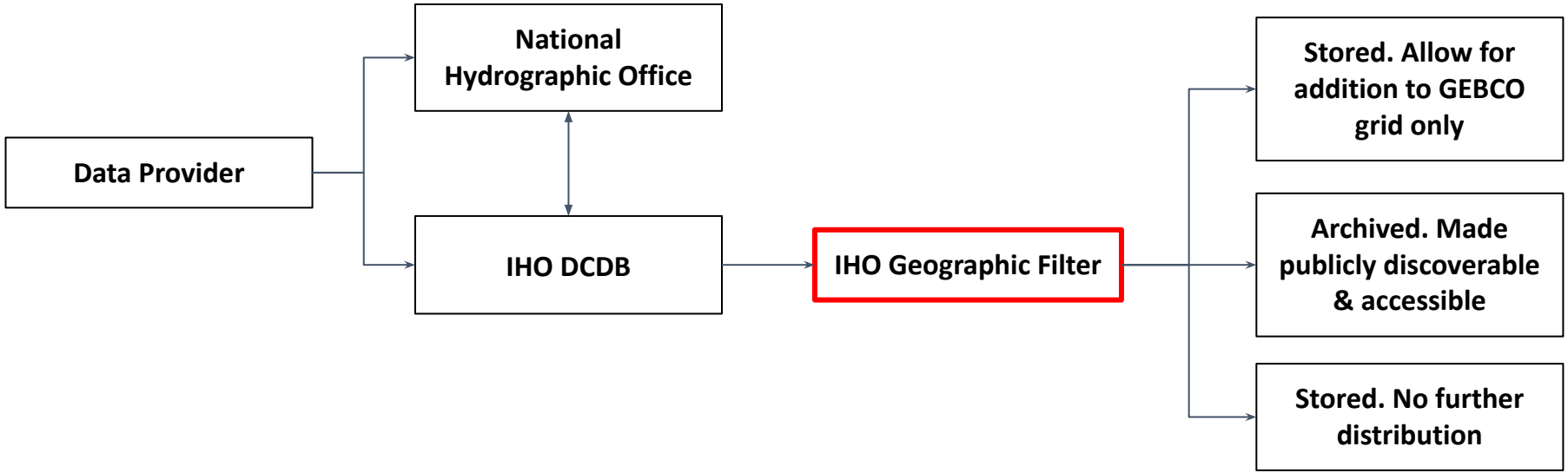


Frequent update of viewer

Data and identifying token are submitted to DCDB via HTTPS post

Geographic Filter

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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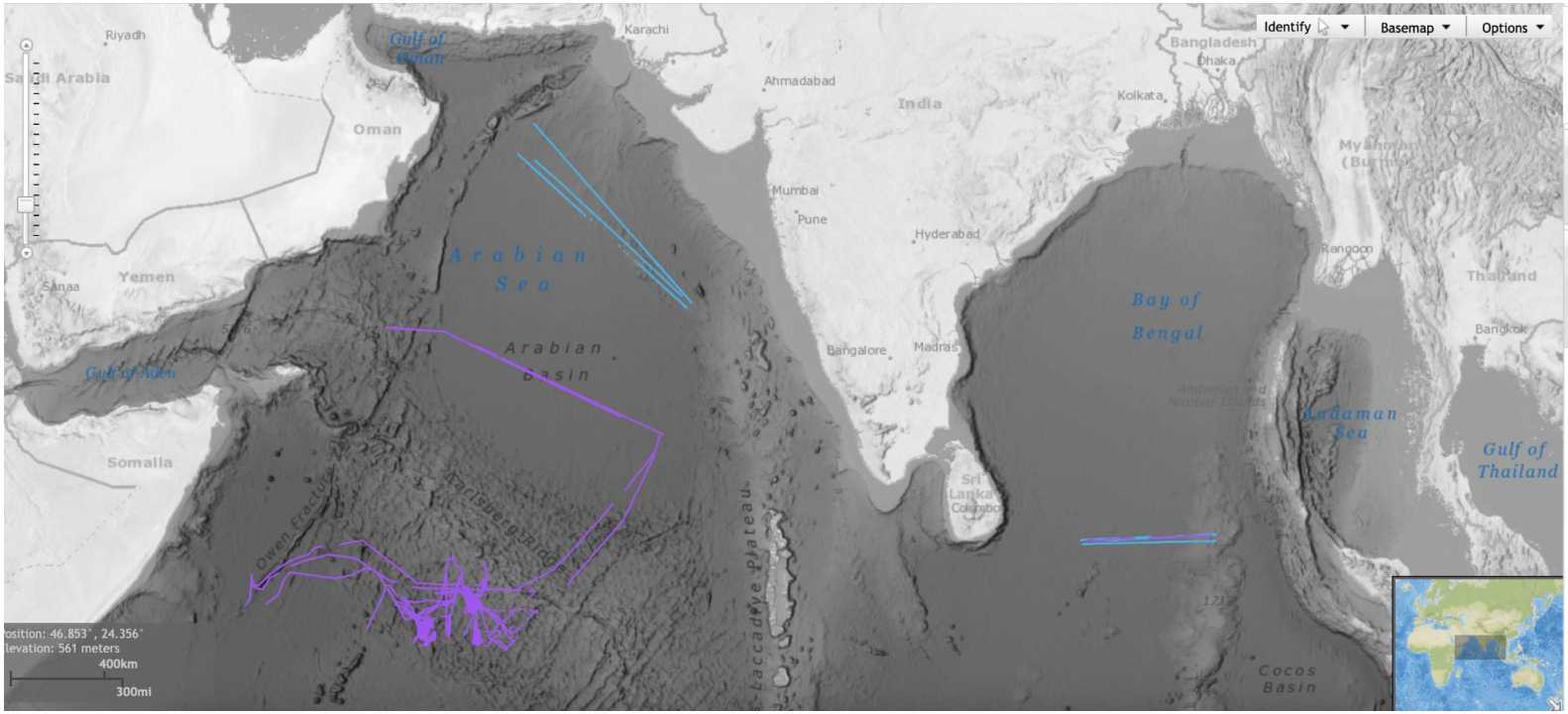
Geographic Filter



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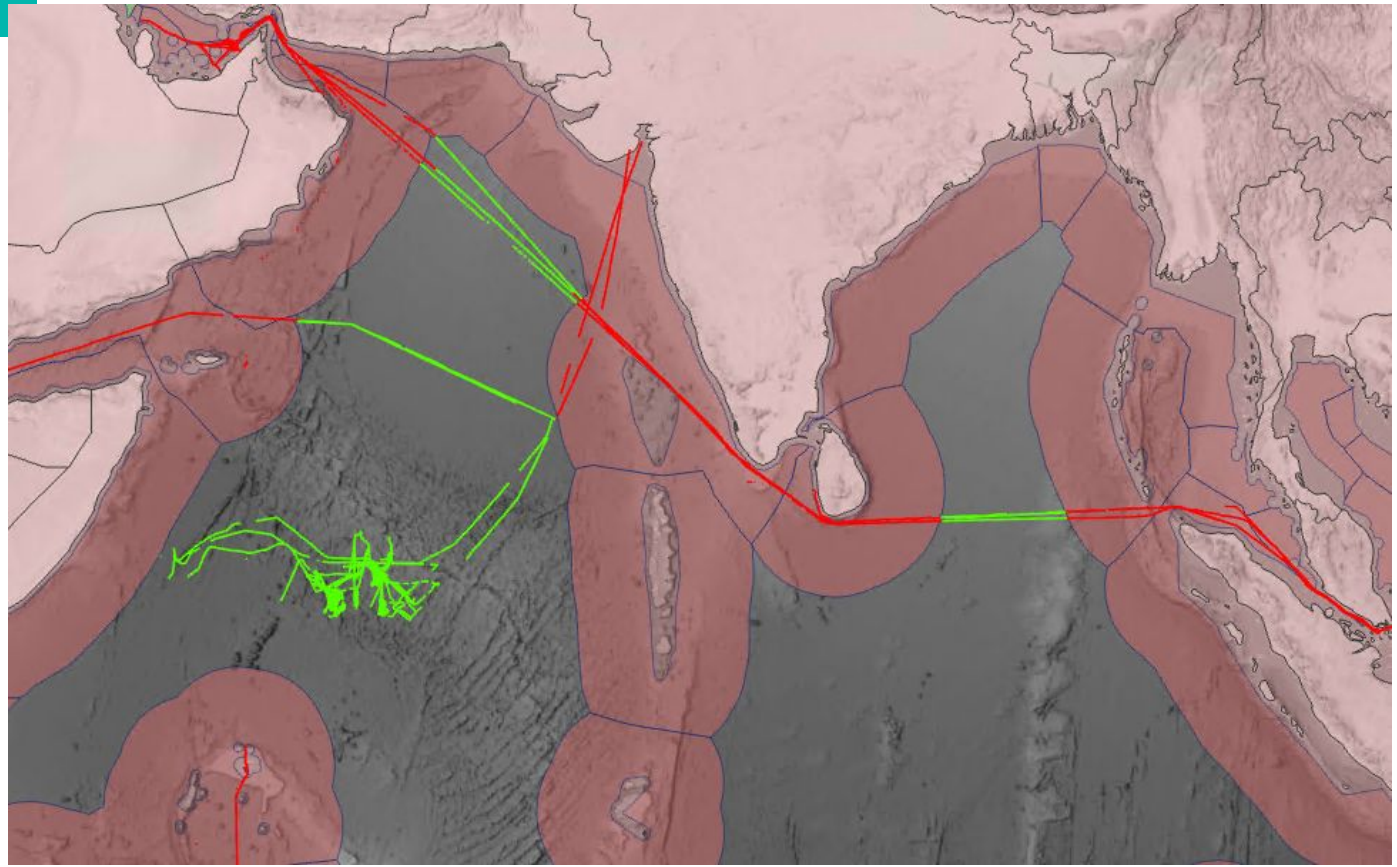
Geographic Filter



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

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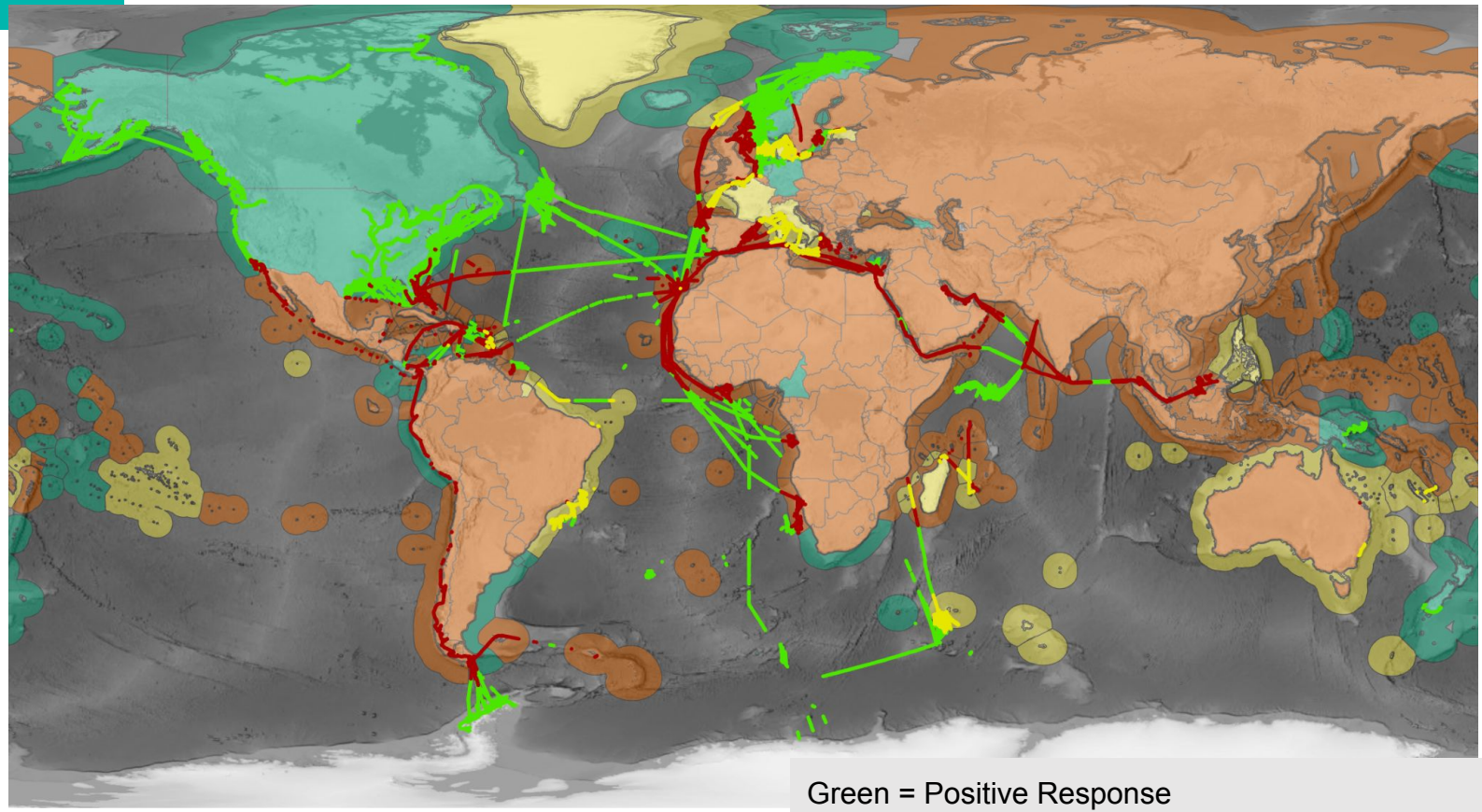
Geographic Filter



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

Map for illustrative purposes only, Nov 2023. (Credit: Marine Regions)

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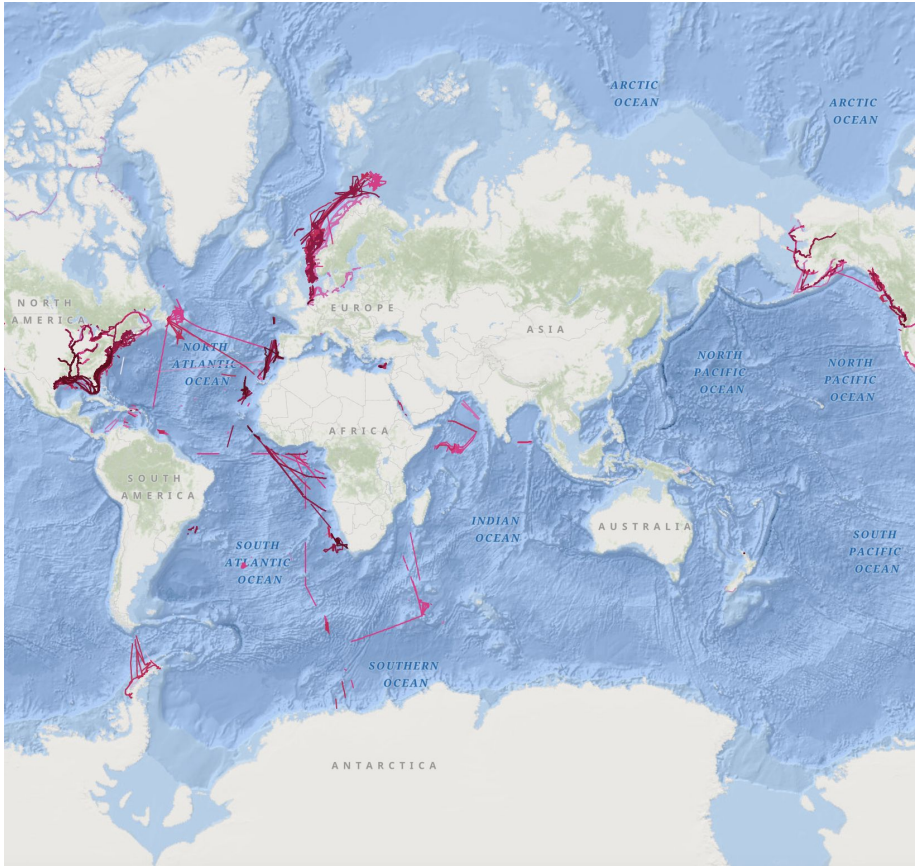
Current Trusted Nodes



- Publicly available data:
  - AquaMap
  - CIDCO
  - FarSounder Inc.
  - GLOS
  - M2Ocean
  - MacGregor Germany/Carnival Cruise Line
  - Orange Force Marine (OFM)
  - Petroleum Geo-Services (PGS)
  - Rosepoint Navigation Systems
  - Seabed 2030
  - SeaKeepers
  - COMIT

- In Process:
  - Alcatel Submarine Network
  - Docktech
  - James Cook University
  - Navico C-MAP
  - NOAA
  - UNHJHC

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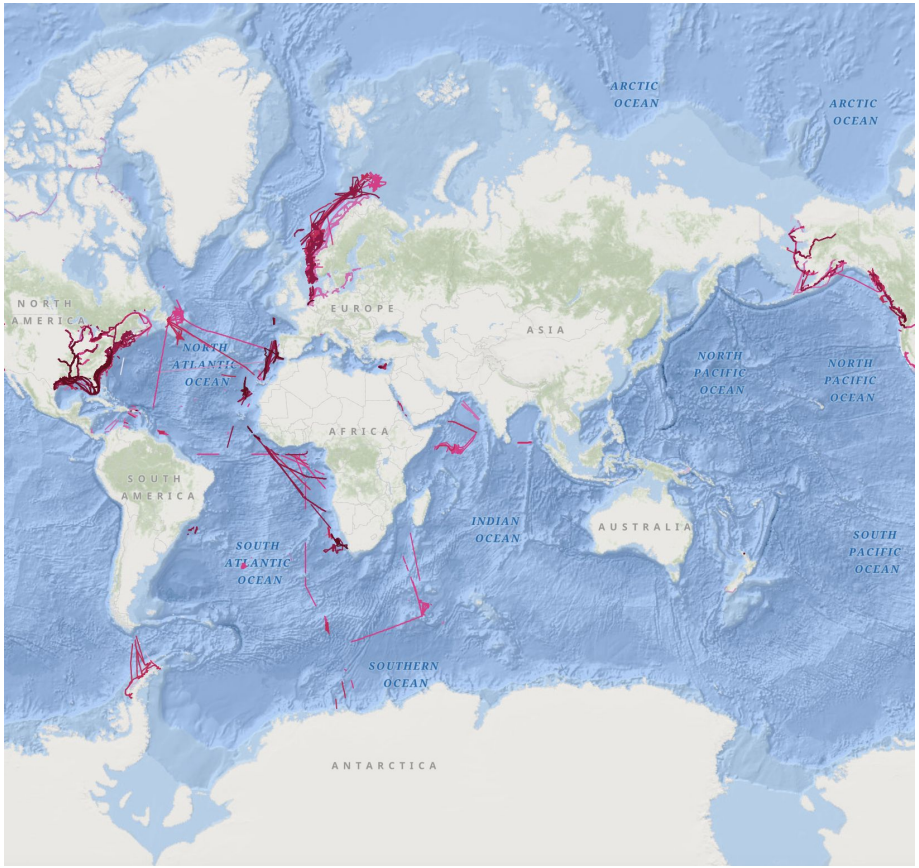
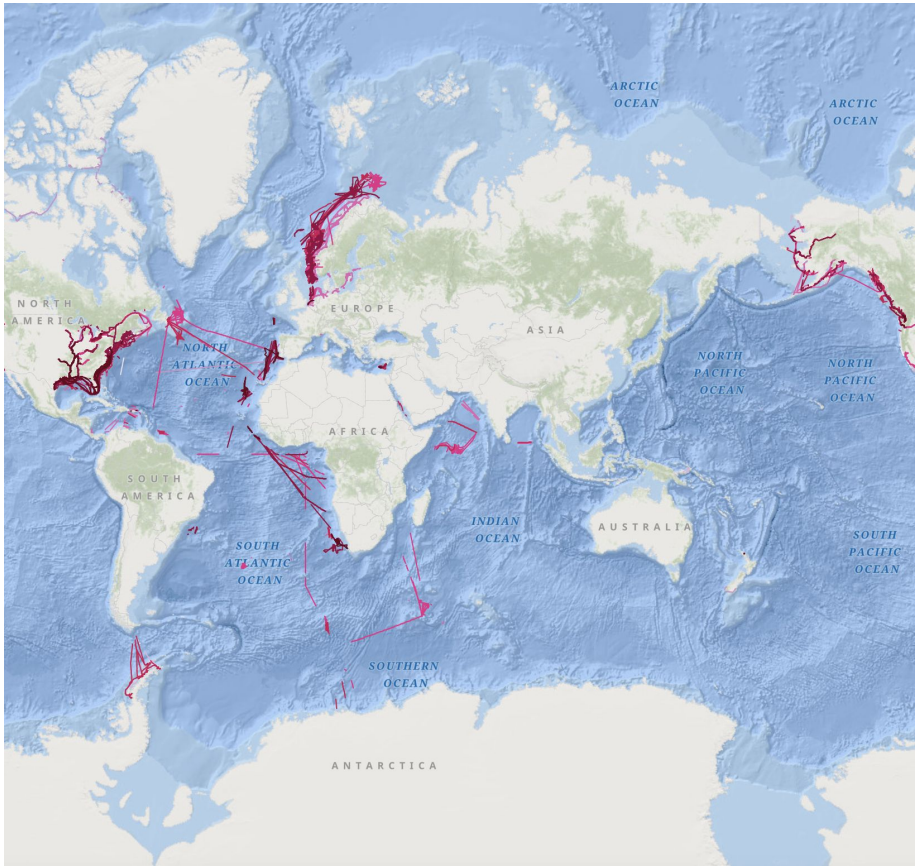
CSB Data Holdings



<u>1,008,164,463</u> points!!!

CSB Data Holdings



- 31.5 GB from 13 trusted nodes currently publicly accessible
    - 89% from Rose Point
    - 369 vessels, including ‘Anonymous’ (up from 257 at CSBWG13)
    - 272 vessels associated with Rose Point
- Additional 6.2 GB filtered based on responses to IHO C/L

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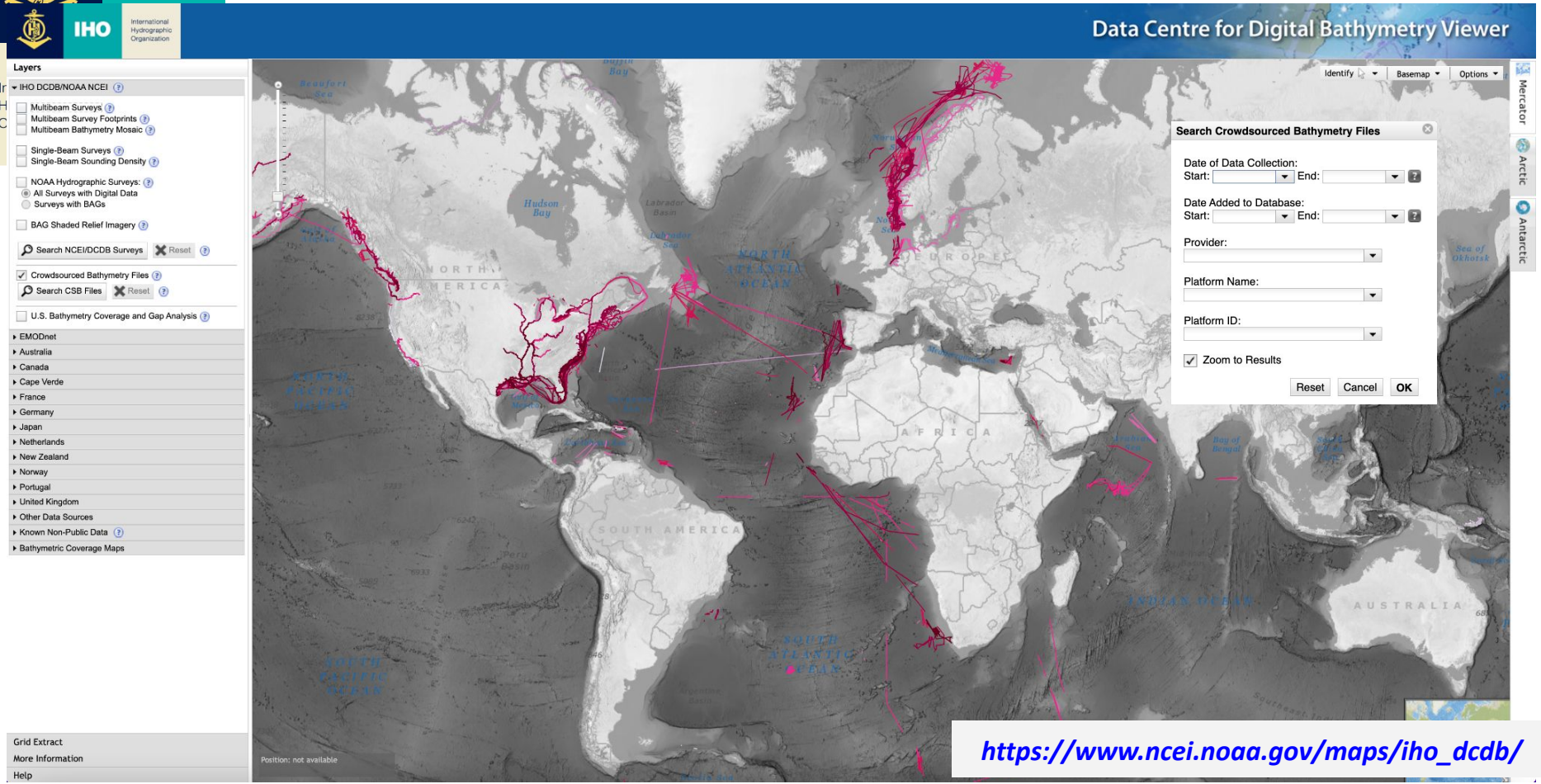
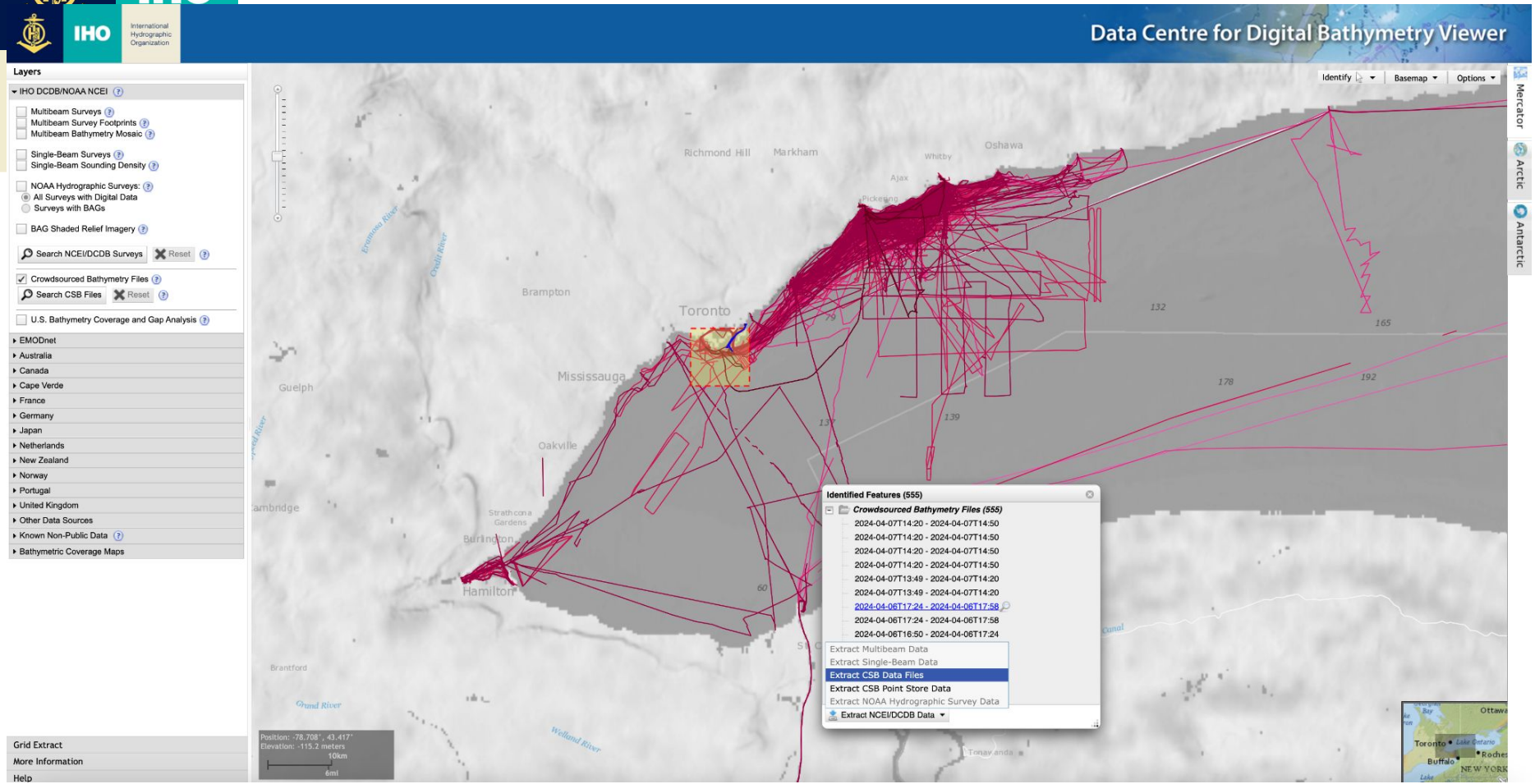
Data Access - DCDB Viewer

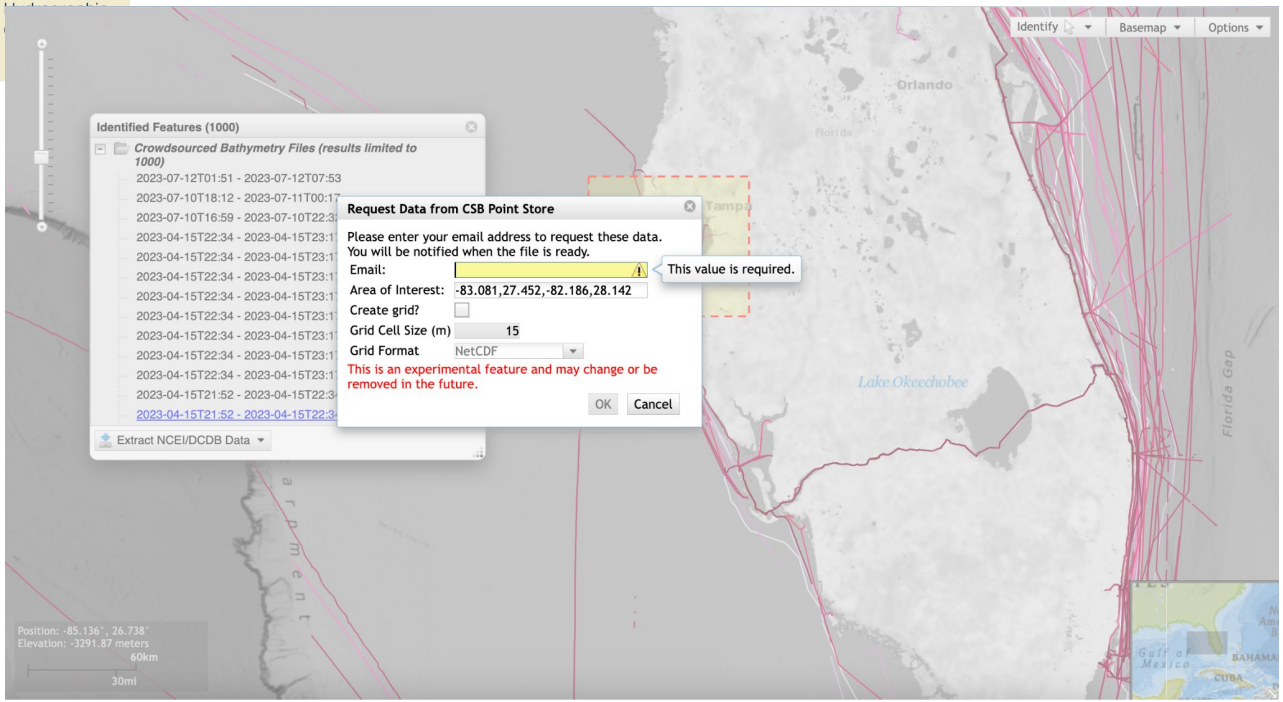


https://www.ncei.noaa.gov/maps/iho_dcdb/

Data Access - DCDB Viewer



Data Access - Point store



- Created a cloud-hosted scalable point data store to better handle and store CSB data as a seamless collection of points.
- Data available in the cloud facilitates their use both for on-prem applications as well as cloud-native processing.
- **Includes an API** for programmatic query and extract from point store

https://github.com/CI-CMG/pointstore-api-docs/blob/main/pointstore_api.md

IHO S3 Bucket

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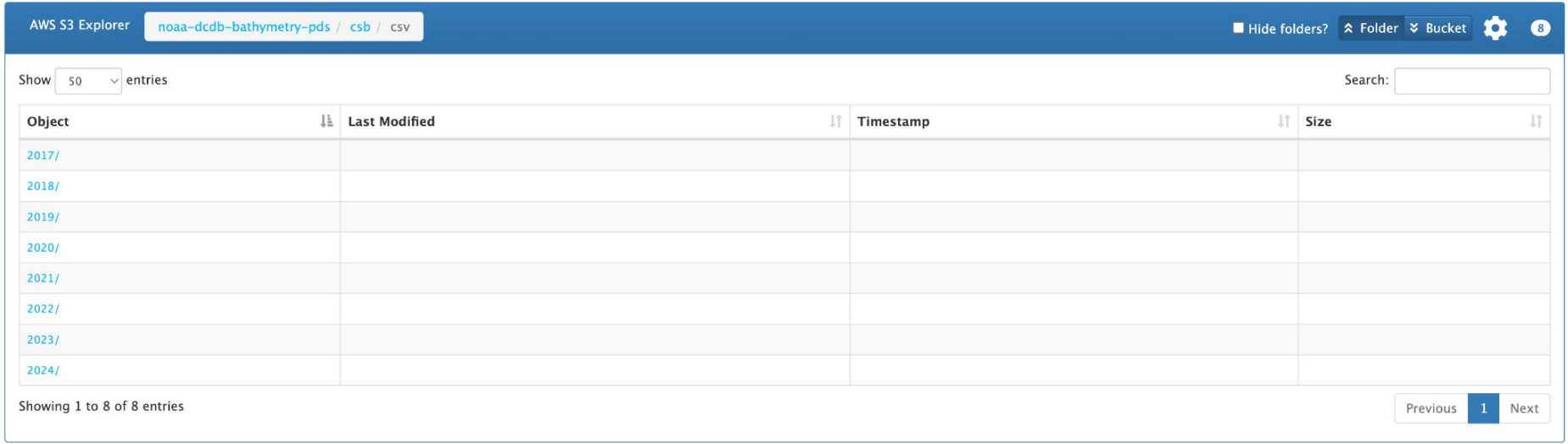

https://noaa-dcdb-bathymetry-pds.s3.amazonaws.com/index.html#csb/csv/

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Updated DCDB Webpage

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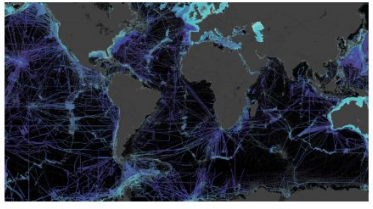
Home / IHO Data Centre for Digital Bathymetry (DCDB)

IHO Data Centre for Digital Bathymetry (DCDB)

The International Hydrographic Organization (IHO) Data Centre for Digital Bathymetry (DCDB) was established in 1990 to steward the global collection of bathymetric data. The Centre archives and shares, freely and without restrictions, depth data contributed by mariners and other stakeholders consistent with IHO direction and guidance. The IHO DCDB is hosted by the U.S. National Oceanic and Atmospheric Administration (NOAA) on behalf of the IHO Member States.

The DCDB archive includes over 70 terabytes (uncompressed) of oceanic depth soundings acquired with multibeam and single beam sonars by hydrographic, oceanographic and industry vessels during surveys or while on passage.

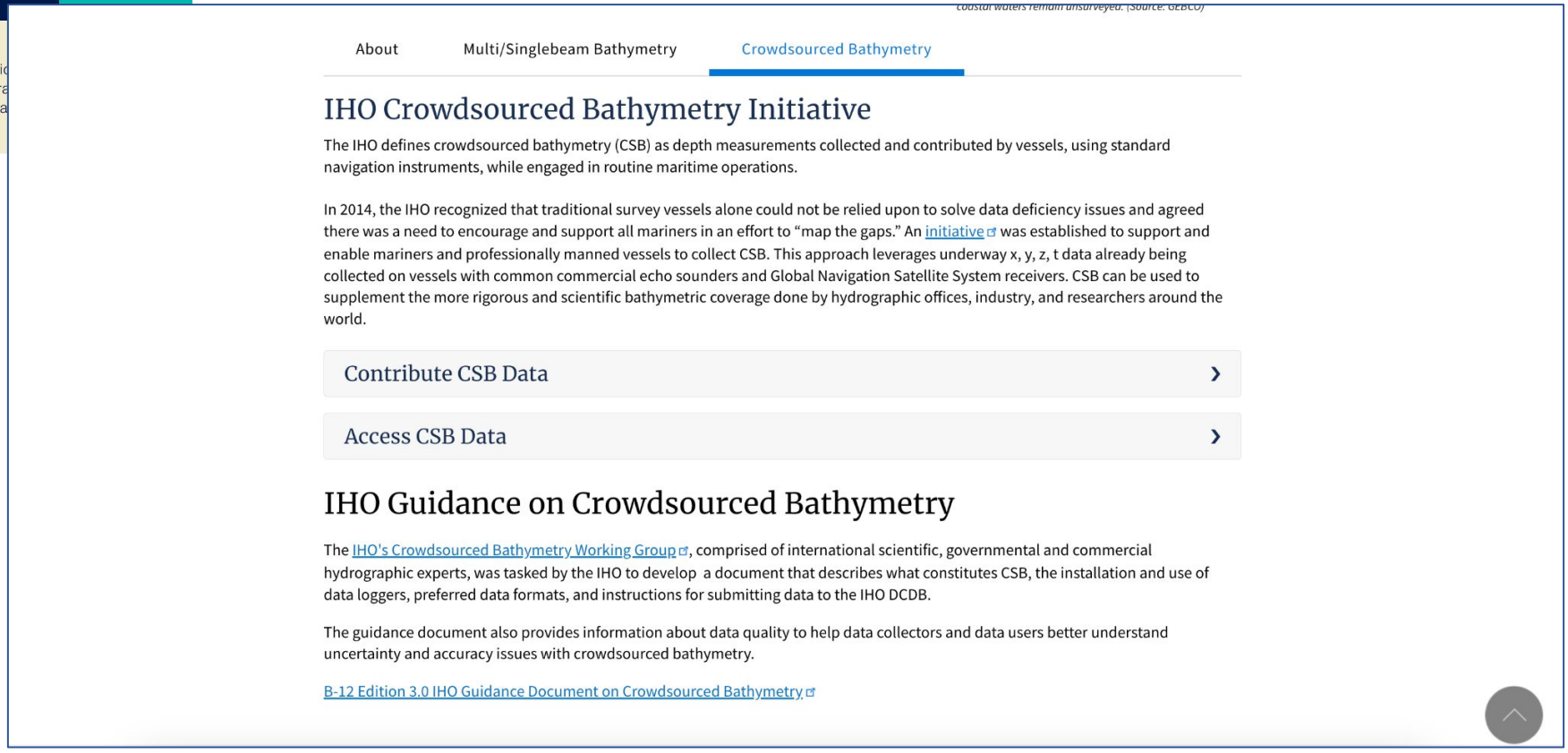


25% of the deep ocean floor has been mapped with direct measurement and approximately 50% of the world's coastal waters remain unsurveyed. (Source: GEBCO)

About | Multi/Singlebeam Bathymetry | Crowdsourced Bathymetry

https://www.ncei.noaa.gov/iho-data-centre-digital-bathymetry

Updated DCDB Webpage



coastal waters remain unsurveyed. (Source: GEBCO)

About | Multi/Singlebeam Bathymetry | Crowdsourced Bathymetry

IHO Crowdsourced Bathymetry Initiative

The IHO defines crowdsourced bathymetry (CSB) as depth measurements collected and contributed by vessels, using standard navigation instruments, while engaged in routine maritime operations.

In 2014, the IHO recognized that traditional survey vessels alone could not be relied upon to solve data deficiency issues and agreed there was a need to encourage and support all mariners in an effort to "map the gaps." An initiative was established to support and enable mariners and professionally manned vessels to collect CSB. This approach leverages underway x, y, z, t data already being collected on vessels with common commercial echo sounders and Global Navigation Satellite System receivers. CSB can be used to supplement the more rigorous and scientific bathymetric coverage done by hydrographic offices, industry, and researchers around the world.

Contribute CSB Data ›

Access CSB Data ›

IHO Guidance on Crowdsourced Bathymetry

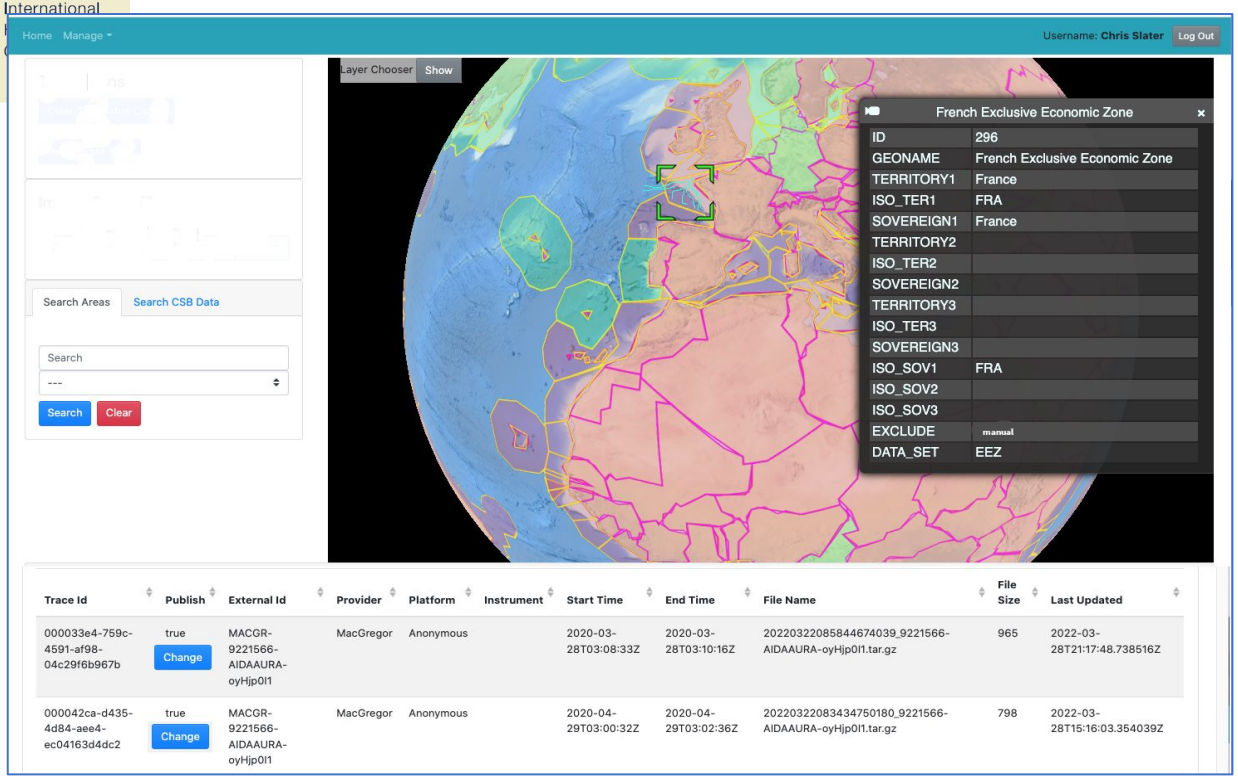
The IHO's Crowdsourced Bathymetry Working Group, comprised of international scientific, governmental and commercial hydrographic experts, was tasked by the IHO to develop a document that describes what constitutes CSB, the installation and use of data loggers, preferred data formats, and instructions for submitting data to the IHO DCDB.

The guidance document also provides information about data quality to help data collectors and data users better understand uncertainty and accuracy issues with crowdsourced bathymetry.

B-12 Edition 3.0 IHO Guidance Document on Crowdsourced Bathymetry

https://www.ncei.noaa.gov/iho-data-centre-digital-bathymetry

CSB Coastal State Review Application



The DCDB has developed a **CSB Coastal State Review Application** to automate the 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 Denmark and France who tested the application last Fall.

Deployment of the application expected this Spring.

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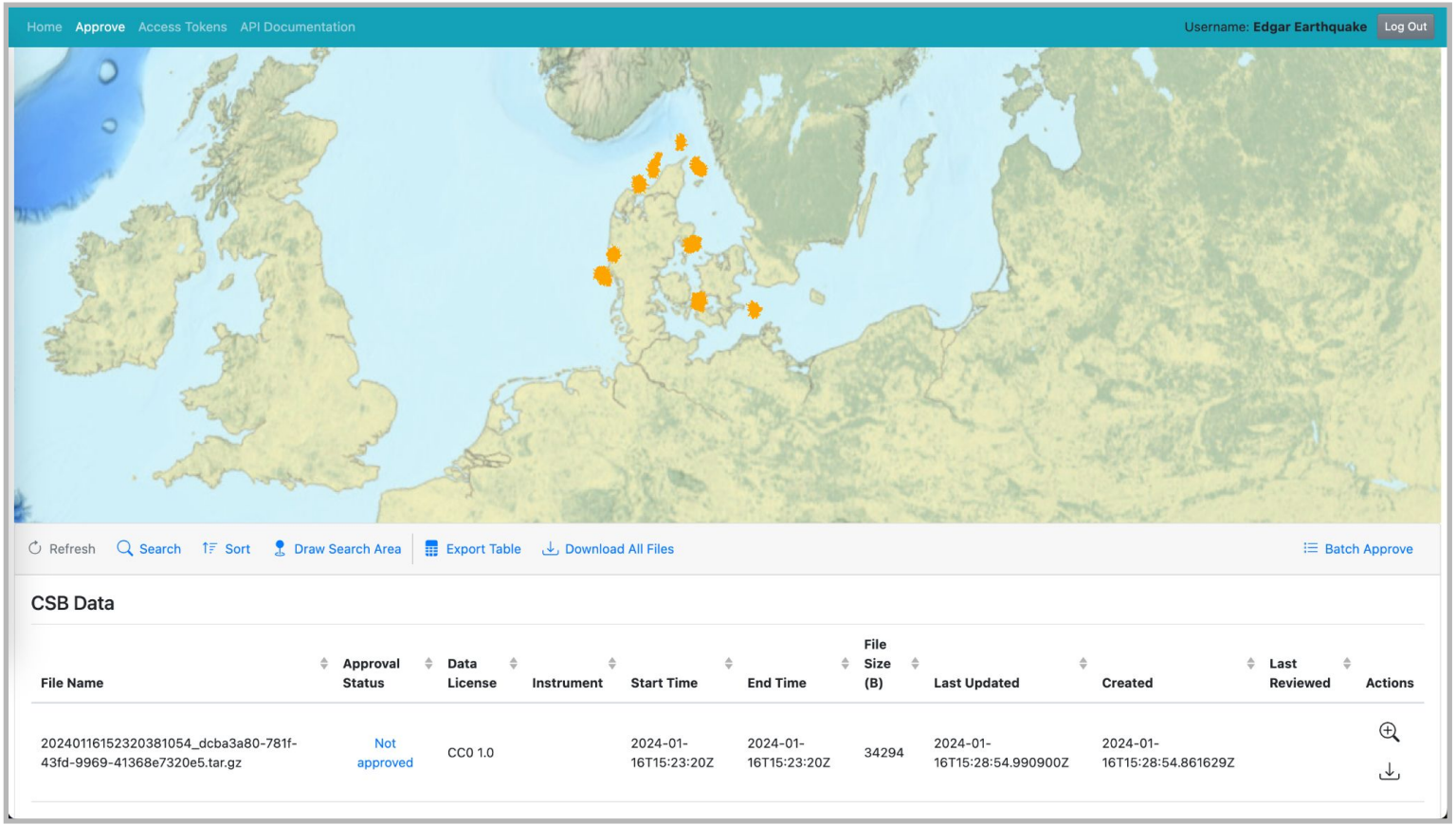

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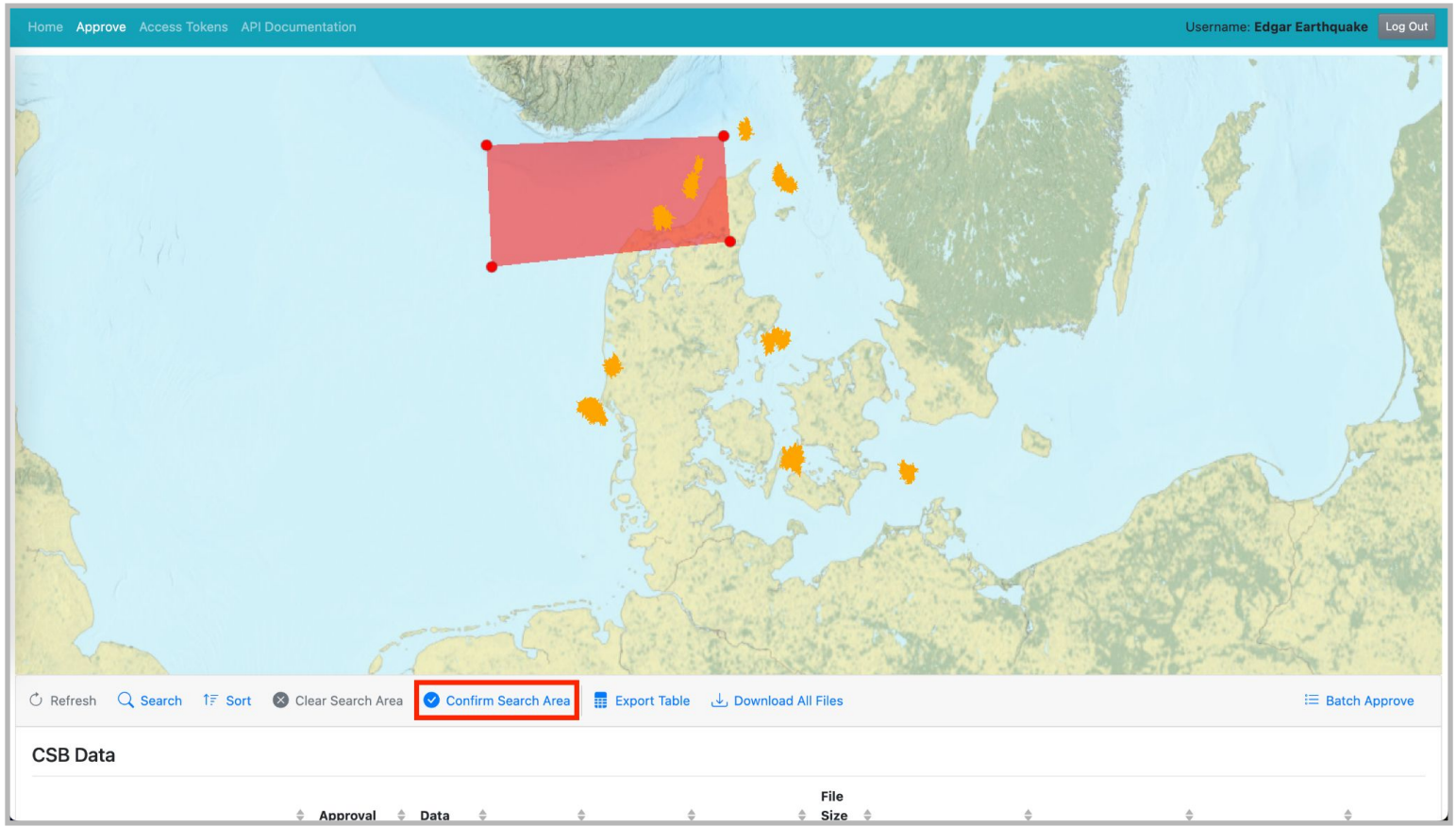

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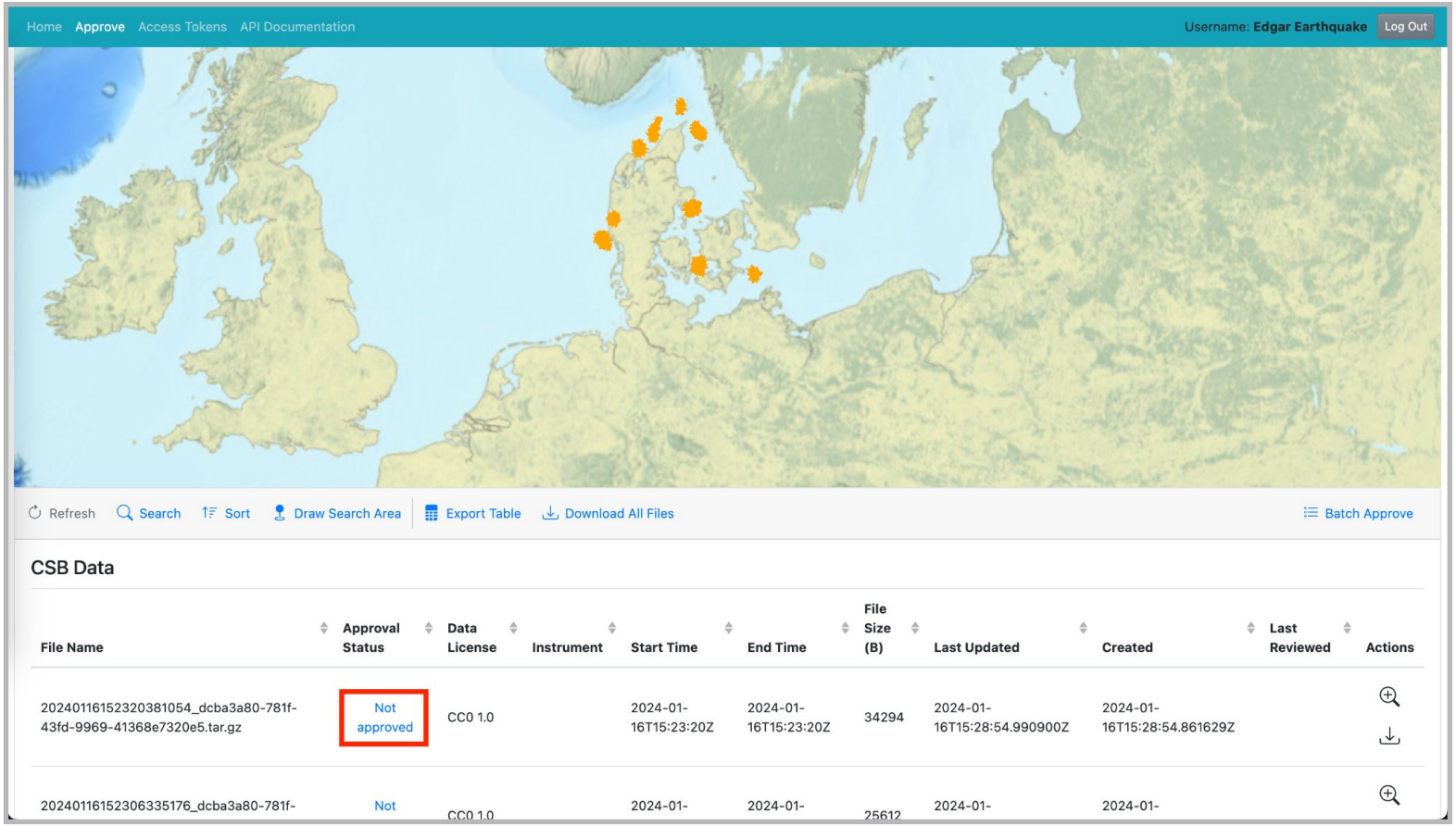

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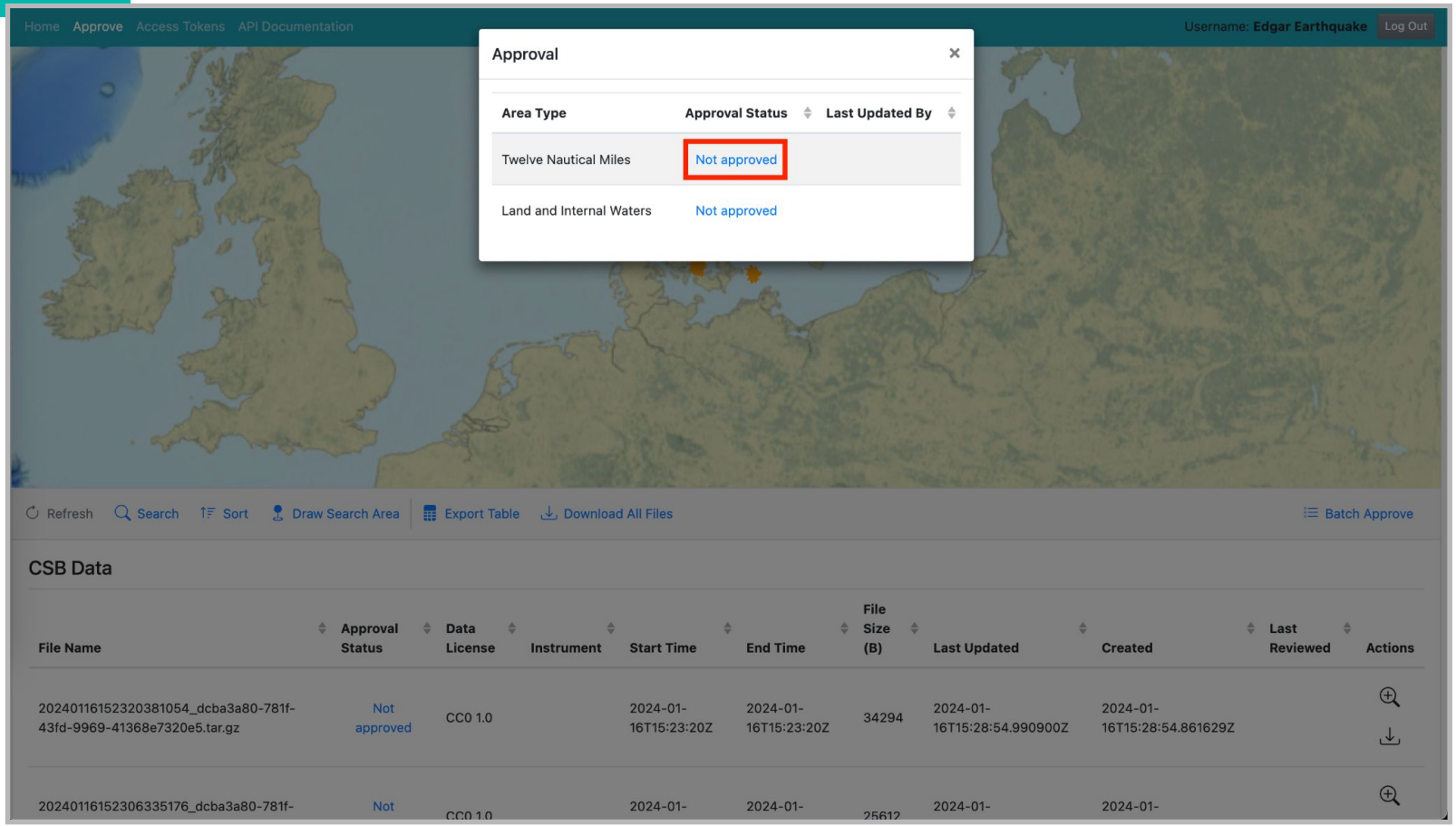

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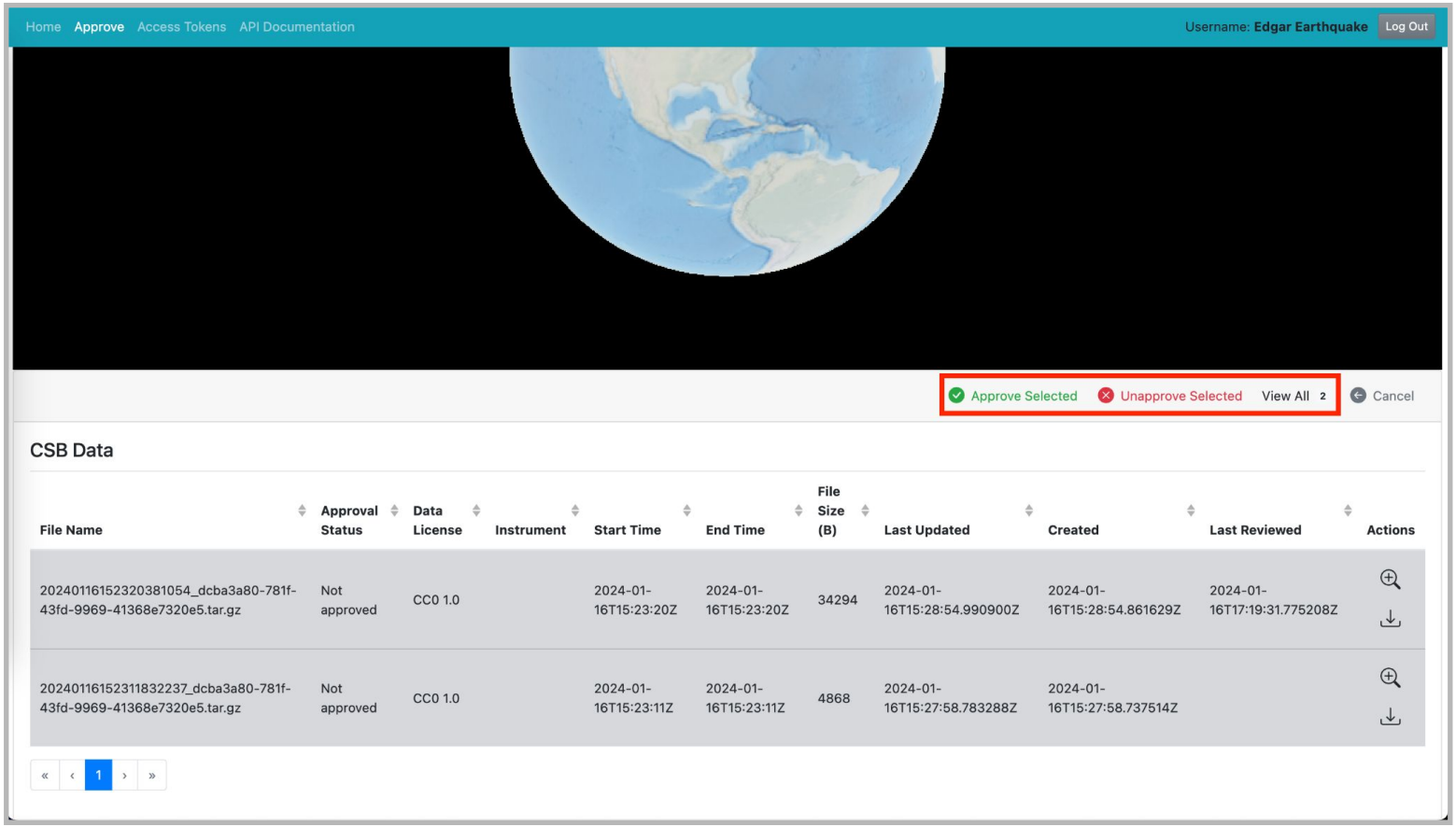

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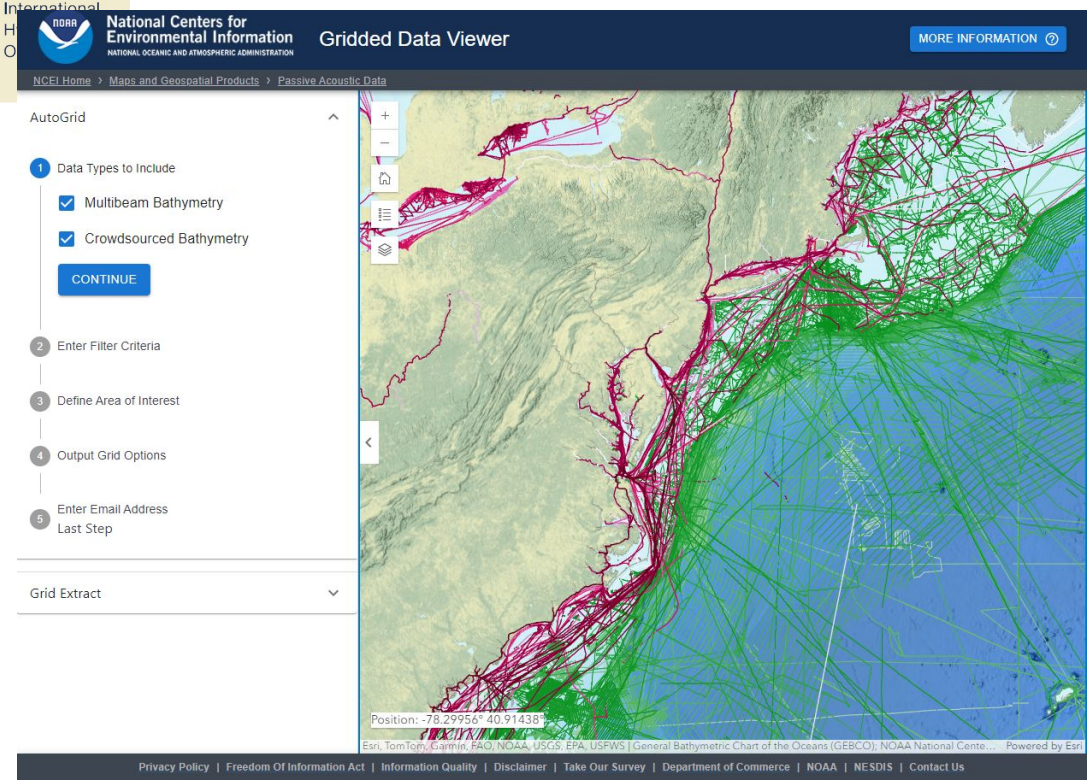
Updated gridded data viewer (“Autogrid”)

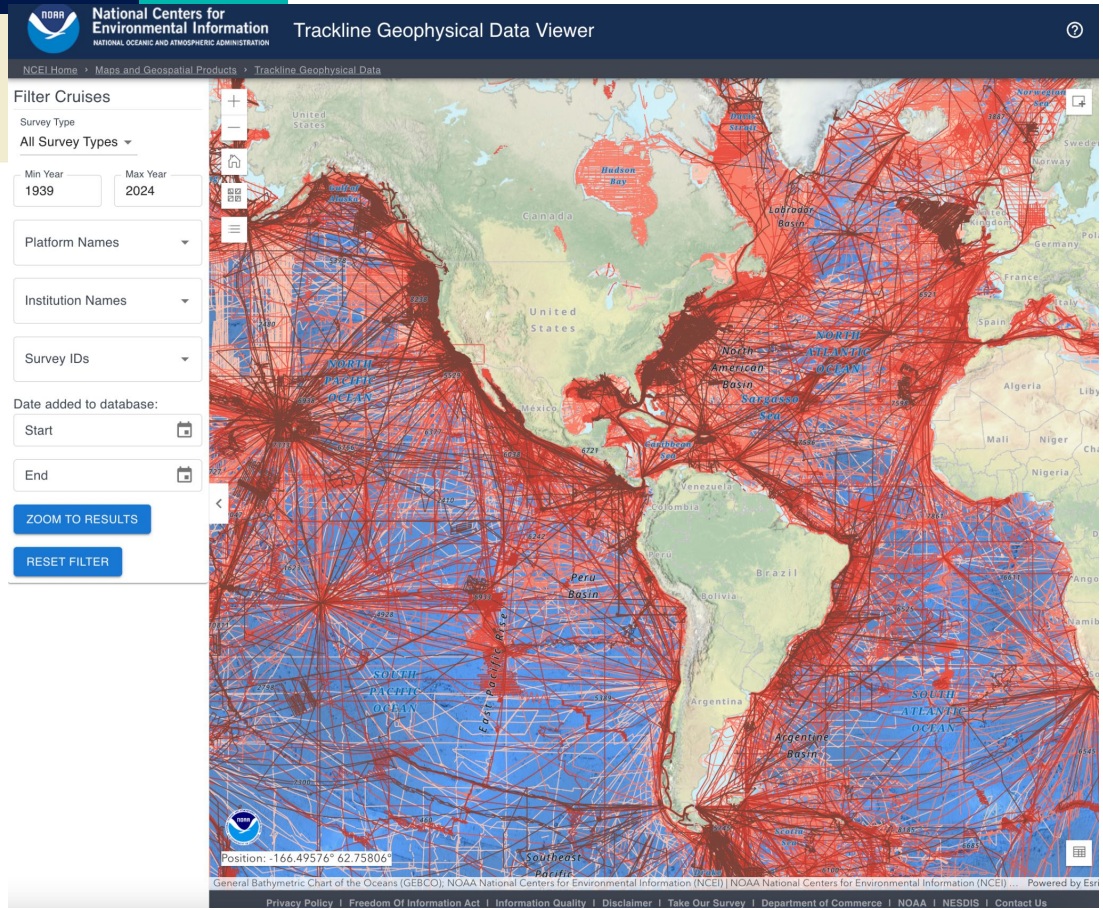


The existing Autogrid web application accepts a user’s area of interest, cell size, and grid format and asynchronously produces a custom data grid from the multibeam archive.

The updated application, currently under development, **integrates multibeam and CSB**.

New filter criteria and output formats will be supported. GEBCO and ETOPO will be added as additional background fill options.

Next Generation Map Viewer



Motivations to modernize map viewers:

- Maintainability
- Ability to update to latest ArcGIS API for JavaScript 4.x
- Use of well-supported libraries
- Modern UI design
- Accessibility - 508 compliance

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CSBWG feedback to be reviewed summer 2024

- Searchable interface for S3 bucket, building towards access of cloud-hosted files corresponding to a particular location.
- Improve approach to translation of files between ArcGIS MapService API and S3 bucket.
- Ensure full metadata is accessible alongside CSV in cloud buckets.
- Ongoing enhancements to approval app, building upon feedback from Denmark and France during testing.
- Ensure pipeline is compatible with GeoJSON schema updates.

We welcome and encourage continued feedback! Our enhancements are based on user requirements.

Thank you.

georgianna.zelenak@noaa.gov

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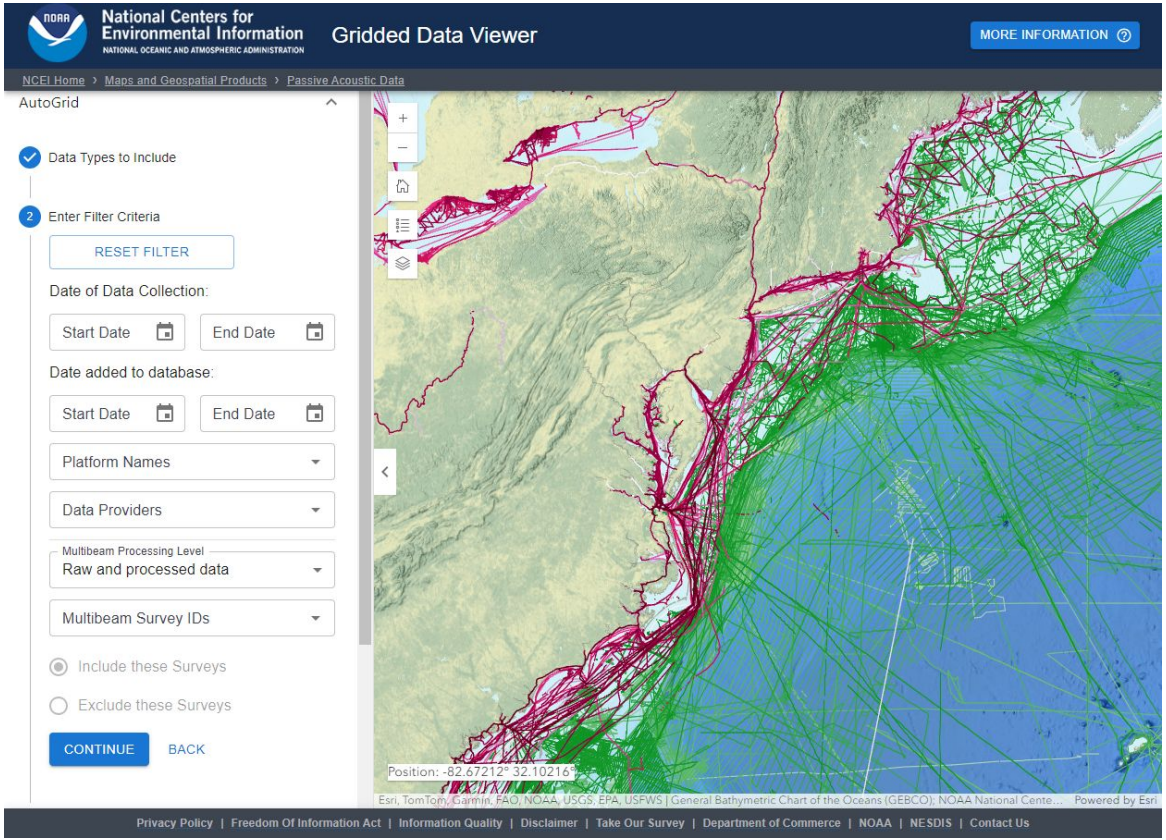

DCDB Enhancements

Development of a “CSB Pointstore Dashboard”