

THE NIPPON FOUNDATION-GEBCO

SEABED 2030



Exploring Applications for Bathymetric Grid Generation

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What is Seabed 2030?

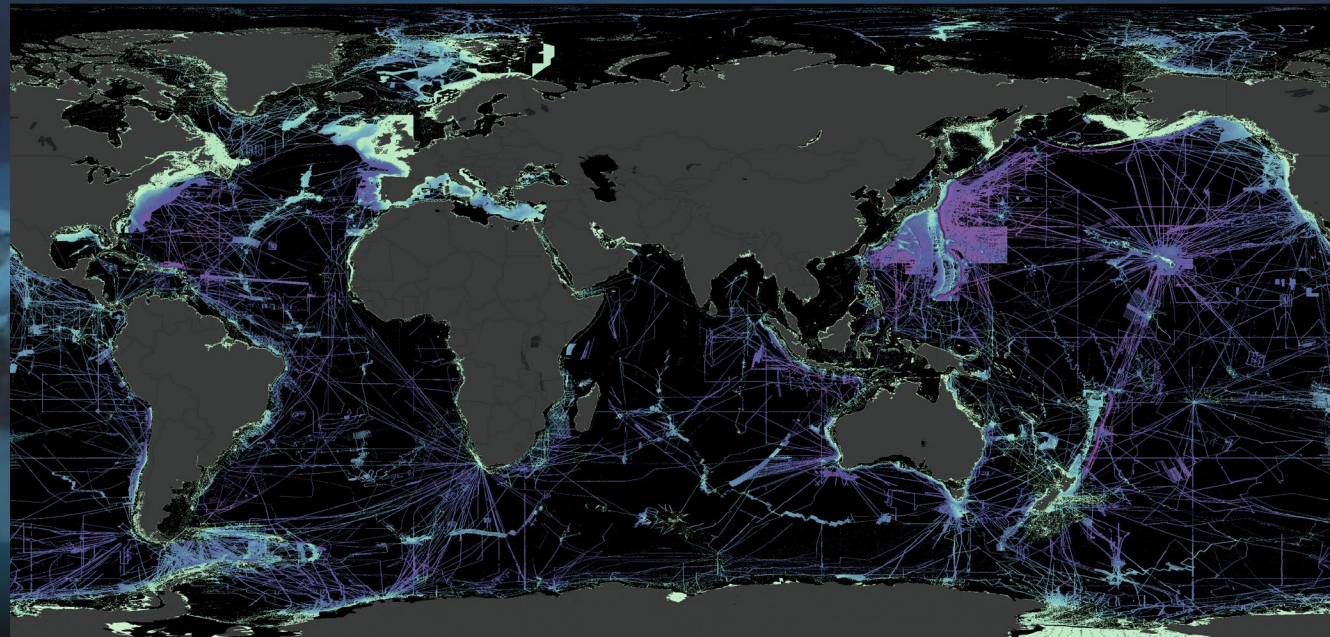
The Nippon Foundation - GEBCO Seabed 2030 Project is a collaborative project to inspire the complete mapping of the world's ocean by 2030, and to compile all bathymetric data into the freely-available GEBCO Ocean Map.

Seabed 2030 aspires to empower the world to make policy decisions, use the ocean sustainably, and undertake scientific research that is informed by a detailed understanding of the global ocean floor.



Why is Seabed 2030 Important?

- Bathymetry data is an essential ocean observation
- Seabed mapping data has broad use and value
- Ocean processes extend beyond territorial waters
- Only ~20% of the ocean has been mapped with direct observation
- Mapping the entire ocean is a massive task that can only be achieved through cooperation and coordination



Why grid data?

Accessibility

Specialist Users

Non-specialist Users

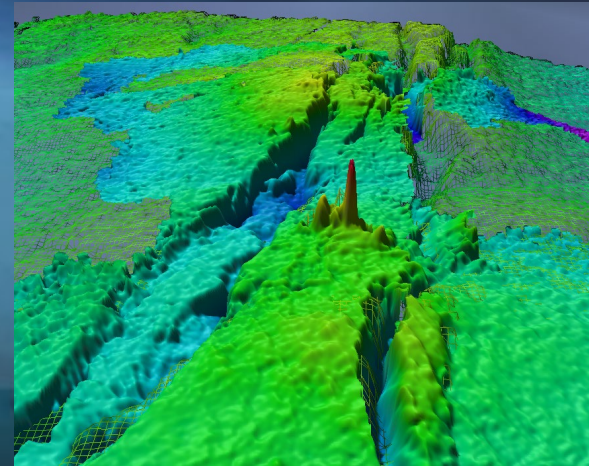
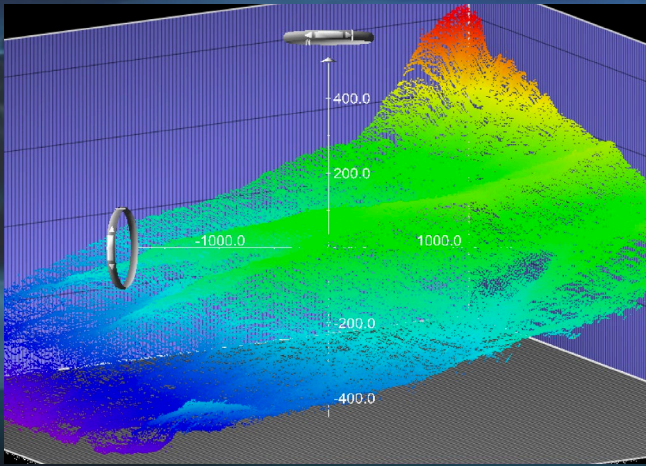
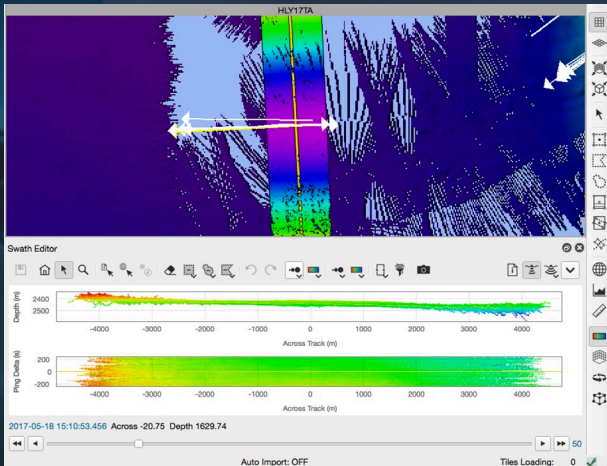
Storage & Data Assembly Efficiency

Swath Files

Point Clouds

Grids

Images





Gridded Bathymetry Data



[Home](#) » [Data & Products](#) » [Gridded Bathymetry Data](#)

Global ocean & land terrain models

GEBCO's current gridded bathymetric data set, the GEBCO_2021 Grid, is a global terrain model for ocean and land, providing elevation data, in meters, on a 15 arc-second interval grid. It is accompanied by a Type Identifier (TID) Grid that gives information on the types of source data that the GEBCO_2021 Grid is based.

For this release, we are making available a version of the grid with under-ice topography/bathymetry information for Greenland and Antarctica.

- [Download global coverage grids](#)
- [Download data for user-defined areas](#)

More [information](#) about the grid, its terms of use and attribution. [Provide feedback](#), tell us how you are using the grid.

Download global coverage grids

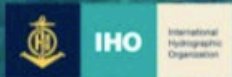
The GEBCO_2021 Grid and TID Grid can be download as global files in netCDF format or a set of 8 tiles (each with an area of 90° x 90°), giving global coverage, in Esri ASCII raster and data GeoTiff formats. The data filea are included in a zip file along with the data set documentation.

Jump to

- > [Seabed 2030](#)
- > [Contribute data](#)
- > [IBCAO_v4](#)
- > [GEBCO Web Services](#)
- > [Printable maps](#)
- > [Historical GEBCO data sets](#)
- > [Imagery](#)
- > [Undersea feature names](#)
- > [Historical GEBCO charts](#)
- > [IHO-IOC GEBCO Cook Book](#)
- > [History of GEBCO book](#)



https://www.gebco.net/data_and_products/gridded_bathymetry_data/



International Hydrographic Organization
Organisation Hydrographique Internationale

IHO DCDB Home

Contribute Data

Crowdsourced Bathymetry

CSB Mapping Projects

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](#)

The World Reference for Raw Bathymetry

<https://www.ngdc.noaa.gov/iho/>





IHO

International
Hydrographic
Organization

International Hydrographic Organization
Organisation Hydrographique Internationale

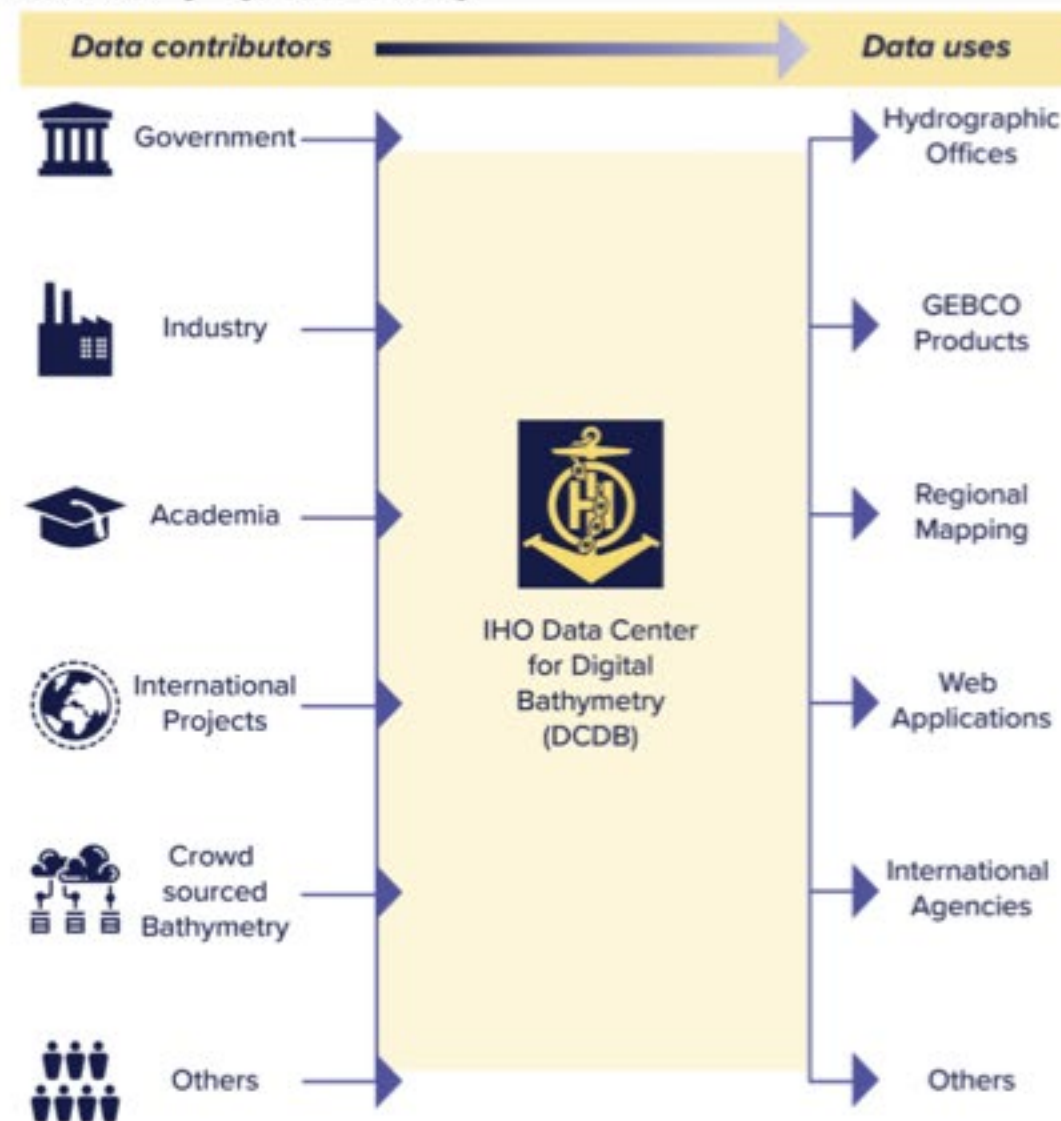


IHO Data Center for Digital Bathymetry (DCDB)

The IHO DCDB is the recognized IHO repository for all ocean bathymetric data.

The DCDB works closely with the Seabed 2030 Project to provide long-term preservation, discovery and access of source bathymetry data.

www.ngdc.noaa.gov/iho/



Extracting Data from IHO DCDB: Download Swath Files

The screenshot displays the IHO Data Centre for Digital Bathymetry Viewer interface. The top header features the IHO logo and the text "Data Centre for Digital Bathymetry Viewer". The main map area shows a bathymetric view of the Caribbean Sea, with green lines representing survey tracks and various geographical features labeled, including the Gulf of Mexico, Mexico Basin, Nares Plain, Puerto Rico Trench, and Guiana Basin. A red dashed box highlights a specific area on the map.

On the left side, there is a "Layers" panel with the following options:

- ☒ IHO DCDB/NOAA NCEI
 - ☒ Multibeam Surveys
 - ☐ 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
- ☐ Japan
- ☐ Netherlands
- ☐ Known Non-Public Data
- ☐ Bathymetric Coverage Maps

At the bottom of the left panel, there are links for "More Information" and "Help".

An "Identified Features (6)" pop-up window is open, displaying a list of survey tracks:

- Note: WMS layers (EMODnet, MAREANO) are only available using a point (single-click) to identify.
- NOAA NCEI Multibeam Bathymetric Surveys (6)
 - FA160003 (2016)
 - EW0103 (2001)
 - EW0105 (2001)
 - EW9501 (1995)
 - EW9417 (1994)
 - RC2605 (1985)

At the bottom of the pop-up, there is a button labeled "Extract NCEI/DCDB Data".

On the right side of the map, there are controls for "Identify", "Basemap", and "Options", along with a vertical menu for map projections: "Mercator", "Arctic", and "Antarctic".



Extracting Data from IHO DCDB: Download Swath Files

IHO International Hydrographic Organization

Data Centre for Digital Bathymetry Viewer

Layers

- ▼ IHO DCDB/NOAA NCEI
 - ☒ Multibeam Surveys
 - ☐ 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
- Japan
- Netherlands
- Known Non-Public Data
- Bathymetric Coverage Maps

More Information

Help

Identify Basemap Options

Mercator Arctic Antarctic

Attributes: FA160003 (2016)

Multibeam Bathymetric Survey: FA160003

[Link to Data](#)

Survey ID: FA160003
Platform Name: Fugro Americas
Survey Year: 2016
Source Organization: Fugro
Chief Scientist:
Instrument: Kongsberg EM302
File Count: 73
Track Length: 3640 km
Total Time: 198 hours
Bathymetry Beams: 391.861152 million
Amplitude Beams: 391.861152 million
Sidescan: 1857.712128 million pixels

Back Zoom to

300mi

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SEABED 2030

Multibeam Report for FA160003

Ship Name: Fugro Americas
Chief Scientist:
Source Organization: Fugro
Start Date: 2016-09-30
End Date: 2016-10-15

View ISO Metadata

Download / Request All Files



[Expand All] [Collapse All]

File Information		
Full Resolution Bathymetry as collected (raw): 73		
Files	File Size	Description
0007_20161006_161234_Fugro_Americas.all.mb58.gz	1021.31MB	Kongsberg multibeam vendor format
0008_20161006_191233_Fugro_Americas.all.mb58.gz	289.33MB	Kongsberg multibeam vendor format
0009_20161006_221236_Fugro_Americas.all.mb58.gz	209.06MB	Kongsberg multibeam vendor format
0010_20161007_011234_Fugro_Americas.all.mb58.gz	268.33MB	Kongsberg multibeam vendor format
0011_20161007_041233_Fugro_Americas.all.mb58.gz	127.68MB	Kongsberg multibeam vendor format
0012_20161007_071237_Fugro_Americas.all.mb58.gz	97.50MB	Kongsberg multibeam vendor format
0013_20161007_101233_Fugro_Americas.all.mb58.gz	106.00MB	Kongsberg multibeam vendor format
0014_20161007_131237_Fugro_Americas.all.mb58.gz	122.78MB	Kongsberg multibeam vendor format
0015_20161007_161241_Fugro_Americas.all.mb58.gz	122.37MB	Kongsberg multibeam vendor format
0016_20161007_191242_Fugro_Americas.all.mb58.gz	99.28MB	Kongsberg multibeam vendor format

Request Summary

Multibeam Surveys 1



HELP

Data Request Summary:

Multibeam Surveys



Files: 74
Compressed Size: 16.2 GB

Request Data:

Email

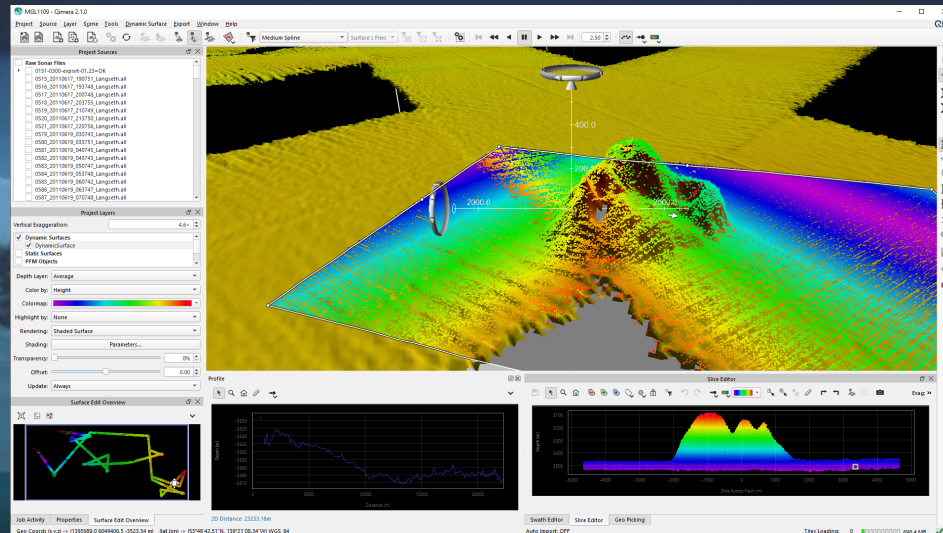
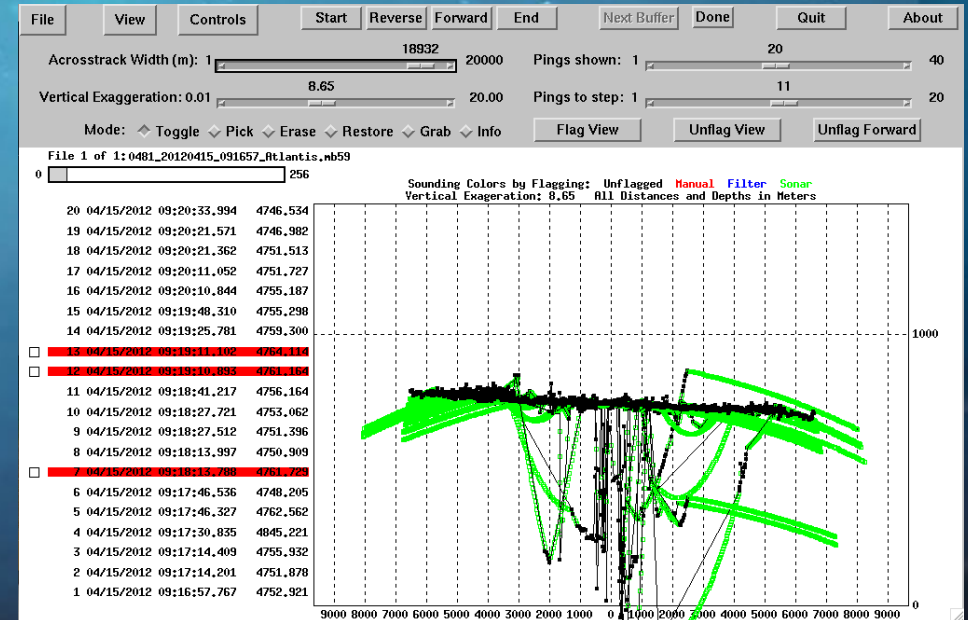
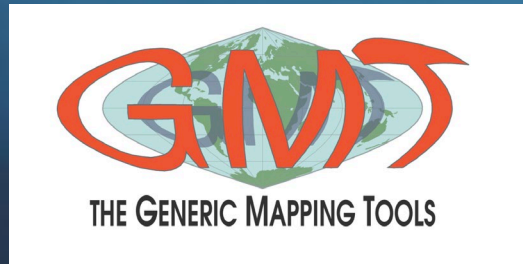
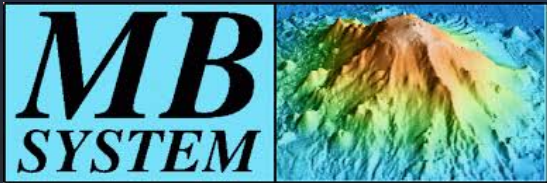
Submit Request

0032_20161009_191223_Fugro_Americas.all.mb58.gz	128.37MB	Kongsberg multibeam vendor format
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Transforming Swath Files into Grids

Several tools are available

- Open Source
- Commercial



IHO – IOC GEBCO Cook Book

A technical reference manual on how to build bathymetric grids

GEBCO aims to provide the most authoritative publicly available bathymetric data sets for the world's oceans.

In order to assist and encourage further participation in bathymetric grid development work, GEBCO has created a technical reference manual, the IHO-IOC GEBCO Cook Book, on how to build bathymetric grids.

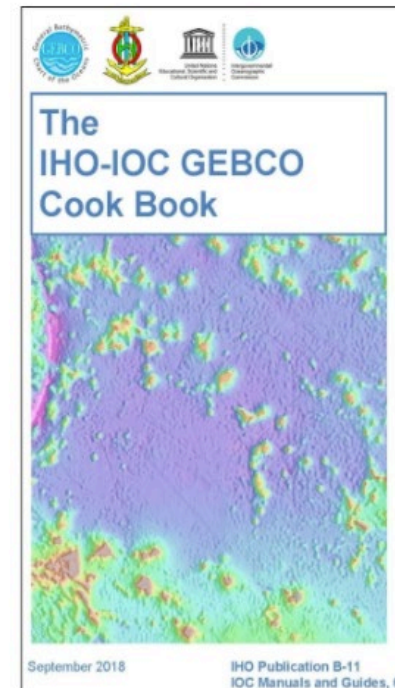
Access a copy of the IHO-IOC GEBCO Cook Book from [web pages](#) hosted at the US Dept. of Commerce, National Oceanic and Atmospheric Administration (NOAA) Laboratory for Satellite Altimetry.

A wide range of topics are included, for example

- gathering data
- data cleaning
- gridding examples
- software overviews

The IHO-IOC GEBCO Cook Book includes input from a number of individuals and organisations, all of whom are experts in their respective fields.


Originally released in October 2012, find out [what's new](#) in the latest (October 2019) release.



Questions?



Extracting Data from IHO DCDB: NOAA Auto-Grid

**NOAA** NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NOAA > NESDIS > NCEI > Maps > Multibeam Bathymetry

AutoGrid

Privacy Policy

Email: (required)

[Privacy Act Statement](#)

About AutoGrid

This program creates grids and map images from multibeam bathymetry data. Three grid types are created:

- NetCDF binary grid
- ESRI ASCII Raster grid
- XYZ (lon/lat/depth) grid.

Map images are produced in postscript, pdf, jpg, png, and gif formats.

To create a new map, use the interface to provide the following:

- Your email address
- Area of interest
- Parameters for the request using the options tabs below
- Select "Submit Request" button

To define an area of interest, select either the *Draw Rectangle* or *Define Bounding Box* tools in the Area of Interest menu at the upper-right of the map.

Draw Rectangle: click and drag to draw a box (note: not available on the Arctic view).

Define Bounding Box: define a bounding box by entering the geographic limits in signed decimal degrees. Longitudes in the western hemisphere are specified with negative values, as are latitudes in the southern hemisphere.

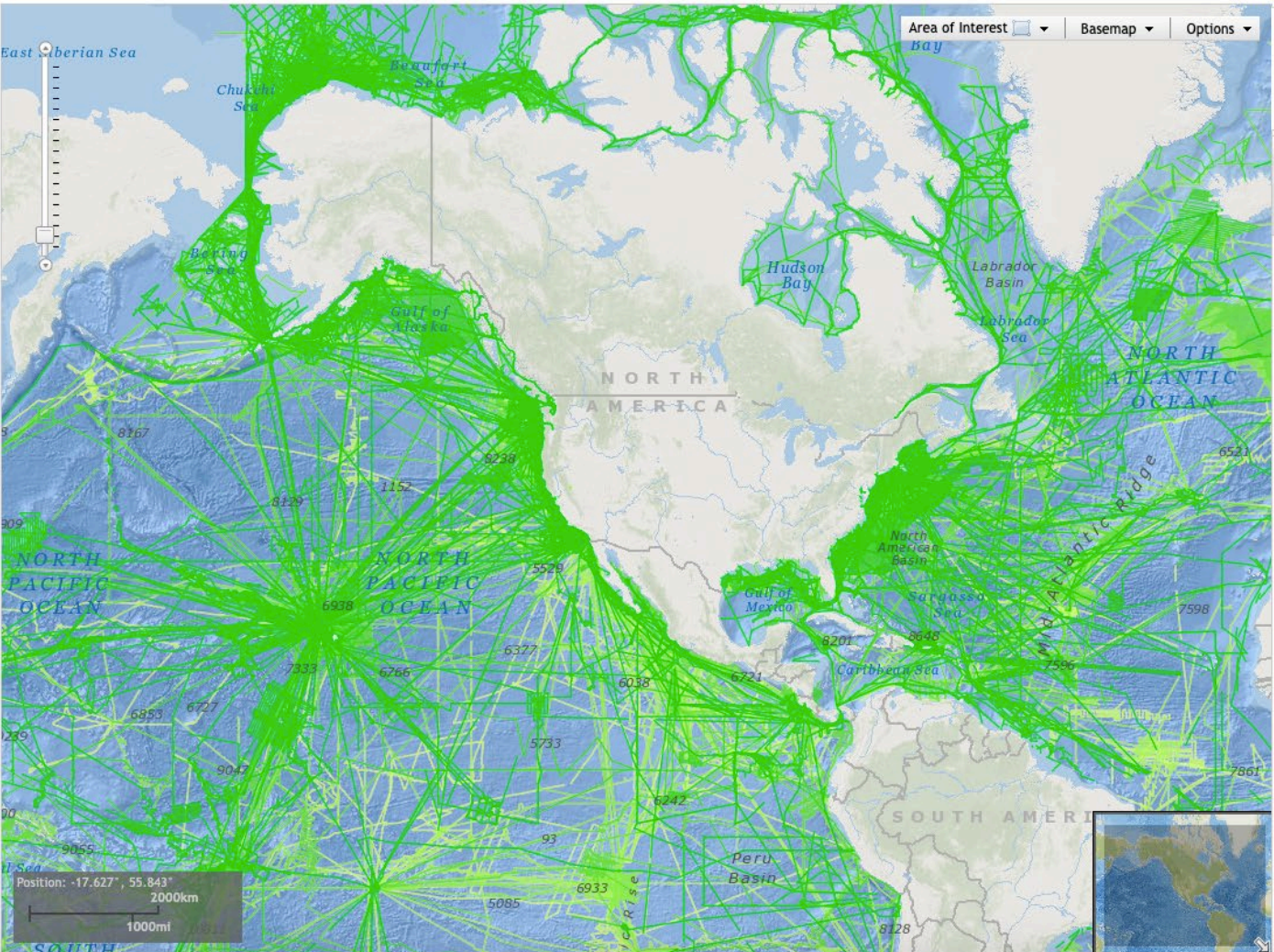
Due to processing capacity, your request must abide by a few limits. Your request will not be submitted if the following conditions are not met:


- total number of grid cells must be less than 2,500,000
- total number of survey lines must be less than

Grid Options

Output Map Options

Help





Extracting Data from IHO DCDB: NOAA Auto-Grid

NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

AutoGrid

NOAA > NESDIS > NCEI > Maps > Multibeam Bathymetry

Privacy Policy

Email: (required)
ferrini@ldeo.columbia.edu
[Privacy Act Statement](#)

Submit Request

About AutoGrid
Grid Options
Output Map Options

Contour Interval (m) 100
approximate depth range: 780 to 1,605 meters

Map Title
Autogrid

Color Table

Area of Interest Basemap Options

Mercator
Arctic

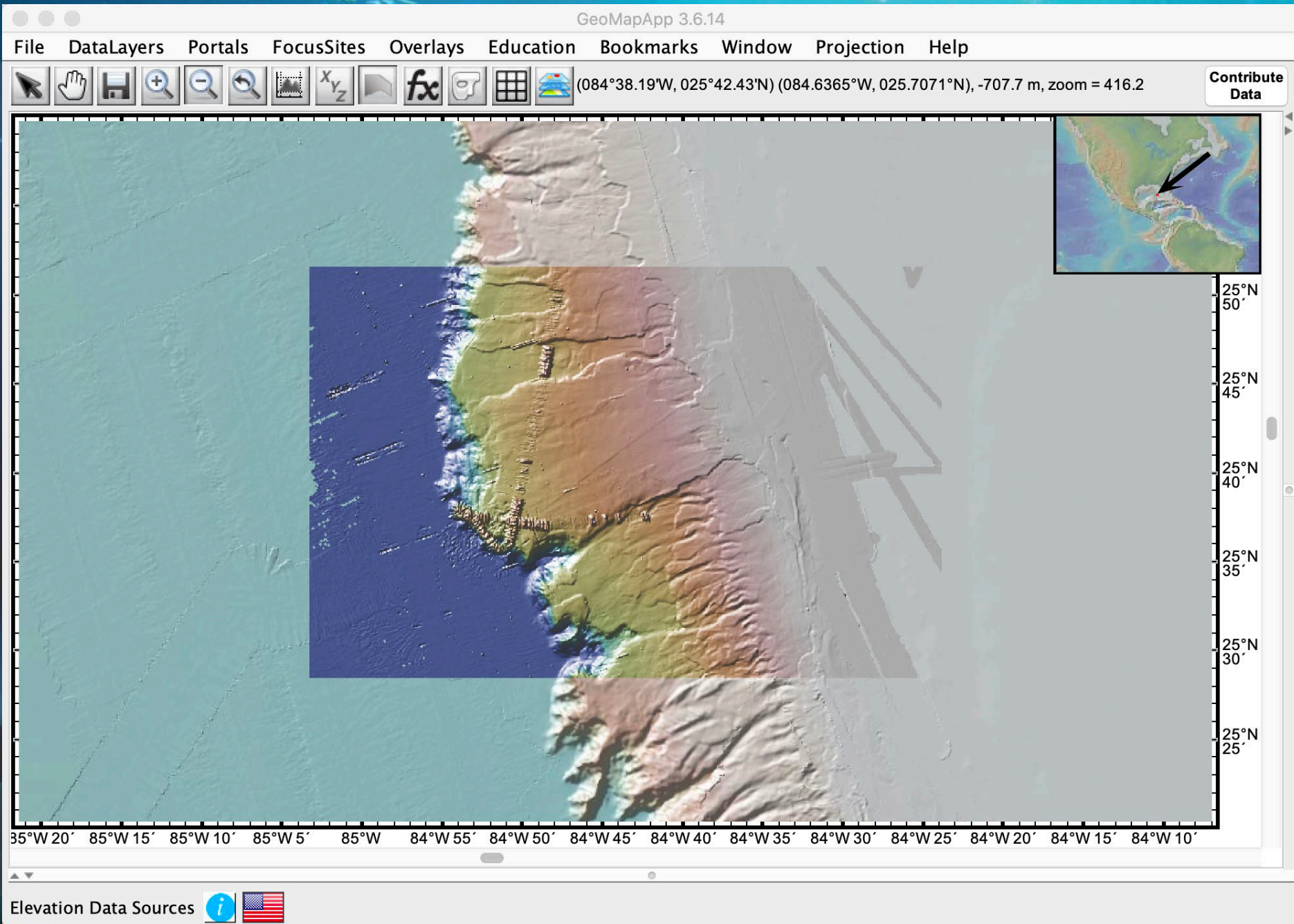
Florida Abyssal Plain

Florida K

Position: -81.650°, 25.682°
60km
40mi

Help





Extracting a CSB grid from DCDB

The screenshot displays the IHO Data Centre for Digital Bathymetry Viewer interface. The top header features the IHO logo and the title "Data Centre for Digital Bathymetry Viewer". The left sidebar contains a "Layers" panel with various data sources, including IHO DCDB/NOAA NCEI, NOAA Hydrographic Surveys, and U.S. Bathymetry Coverage and Gap Analysis. The main map area shows a bathymetric view of Jacksonville, Florida, with a red rectangular selection box highlighting a specific area. A tooltip within the red box reads "Press down to start and let go to finish". The map includes a scale bar (10km/10mi) and a position/elevation readout. The right sidebar shows map controls like "Identify", "Basemap", and "Options", along with projection options (Mercator, Arctic, Antarctic). The bottom right corner features the "SEABED 2030" logo.

IHO International Hydrographic Organization

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 ?
- 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

Japan

Netherlands

New Zealand

United Kingdom

Known Non-Public Data ?

Bathymetric Coverage Maps

More Information

Help

Identify Basemap Options

Mercator Arctic Antarctic

Position: -81.401°, 30.502°
Elevation: -7.23072 meters
10km
10mi

Jacksonville

SEABED 2030

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

Extracting a CSB grid from DCDB

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
- Search NCEI/DCDB Surveys
- ☒ Crowdsourced Bathymetry Files
 - Search CSB Files
- ☐ U.S. Bathymetry Coverage and Gap Analysis

EMODnet

- Australia
- Canada
- France
- Japan
- Netherlands
- New Zealand
- United Kingdom
- Known Non-Public Data
- Bathymetric Coverage Maps

More Information

Help

Identified Features (27)

- Crowdsourced Bathymetry Files (27)**
 - 2099-10-15T12:51 - 2099-10-19T09:55
 - 2020-07-14T15:15 - 2020-07-14T22:21
 - 2020-02-25T18:47 - 2020-02-27T09:15
 - 2020-01-23T13:22 - 2020-01-23T19:07
 - 2019-10-28T21:58 - 2019-11-06T18:22
 - 2019-10-24T14:53 - 2019-10-24T16:44
 - 2019-10-24T08:01 - 2019-10-24T14:36
 - 2019-05-04T11:49 - 2019-05-04T18:47
 - 2019-04-18T19:57 - 2019-05-07T16:42

Extract Multibeam Data

Extract Single-Beam Data

Extract CSB Data Files

Extract CSB Point Store Data

Extract NOAA Hydrographic Survey Data

Extract NCEI/DCDB Data

Position: -80.993°, 30.146°
Elevation: -22.9 meters

10km
10mi

SEABED 2030

Extracting a CSB grid from DCDB

IHO International Hydrographic Organization

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
- Search NCEI/DCDB Surveys
- Crowdsourced Bathymetry Files
- Search CSB Files
- U.S. Bathymetry Coverage and Gap Analysis

EMODnet

Australia

Canada

France

Japan

Netherlands

New Zealand

United Kingdom

Known Non-Public Data

Bathymetric Coverage Maps

More Information

Help

Identify Basemap Options

Mercator Arctic Antarctic

Position: -80.993°, 30.146°
Elevation: -22.9 meters
10km
10mi

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

2020-07-14T15:15 - 2020-07-14T22:21

2020-02-25T18:47 - 2020-02-27T09:15

2020-01-23T13:22 - 2020-01-23T19:07

2019-10-28T21:58 - 2019-11-06T18:22

2019-10-24T14:53 - 2019-10-24T16:44

2019-10-24T08:01 - 2019-10-24T14:36

2019-05-04T11:49 - 2019-05-04T18:47

2019-04-18T19:57 - 2019-05-07T16:42

2019-03-31T17:57 - 2019-03-31T18:37

2018-12-19T05:56 - 2019-01-10T20:30

2018-12-09T02:13 - 2018-12-19T05:56

2018-12-05T09:06 - 2018-12-05T23:52

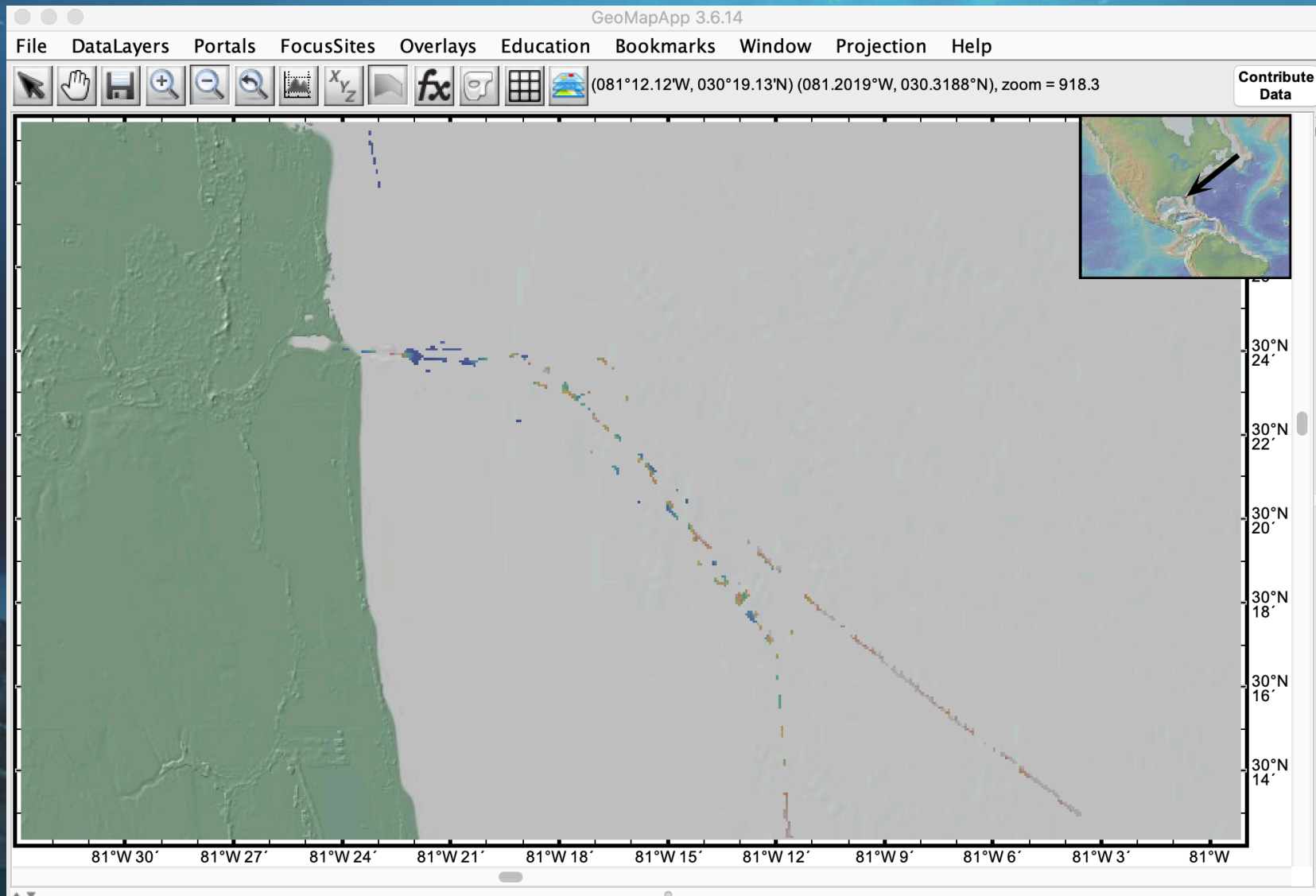
Extract NCEI/DCDB Data

Jacksonville

THE NIPPON FOUNDATION-GEBCO

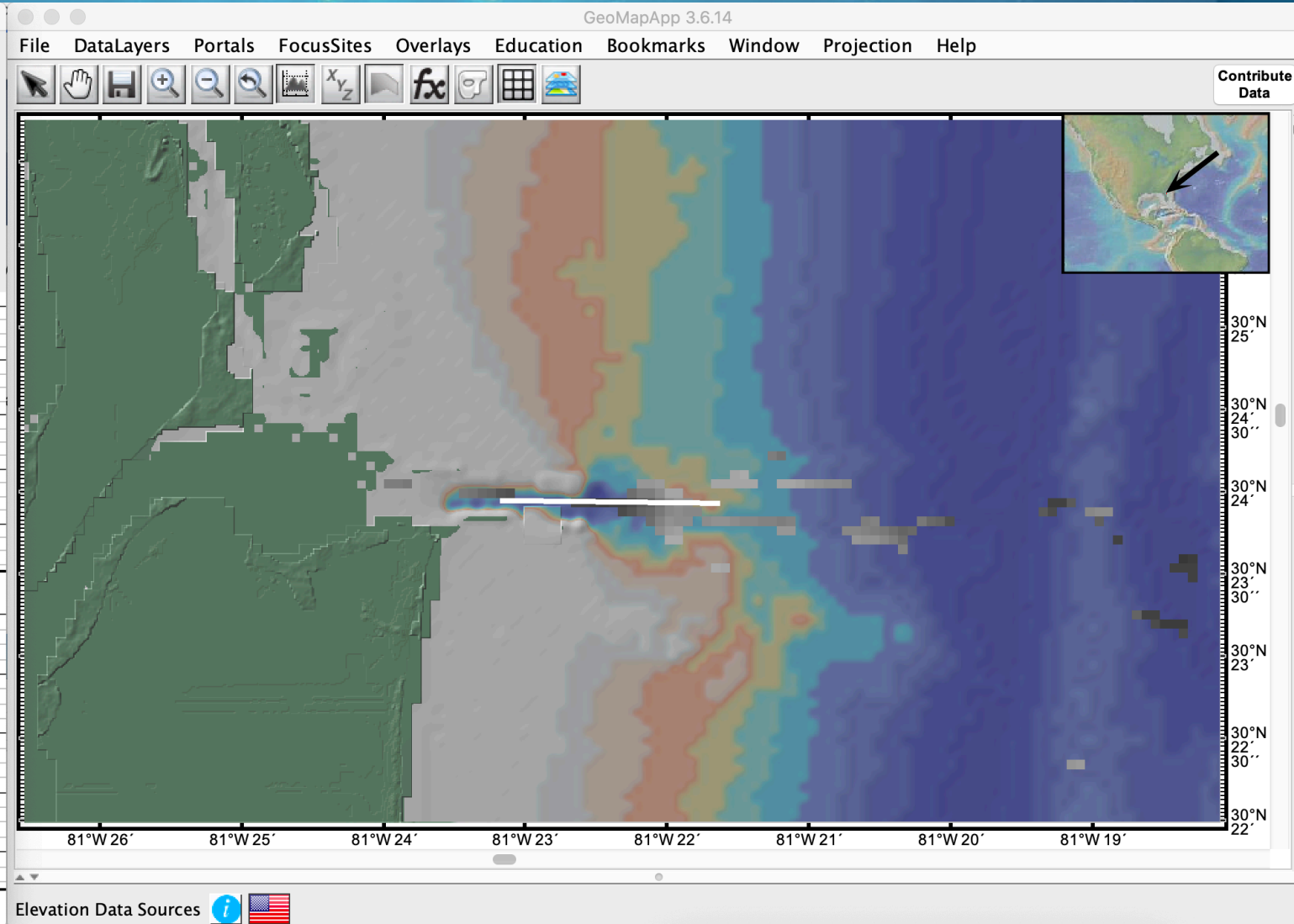
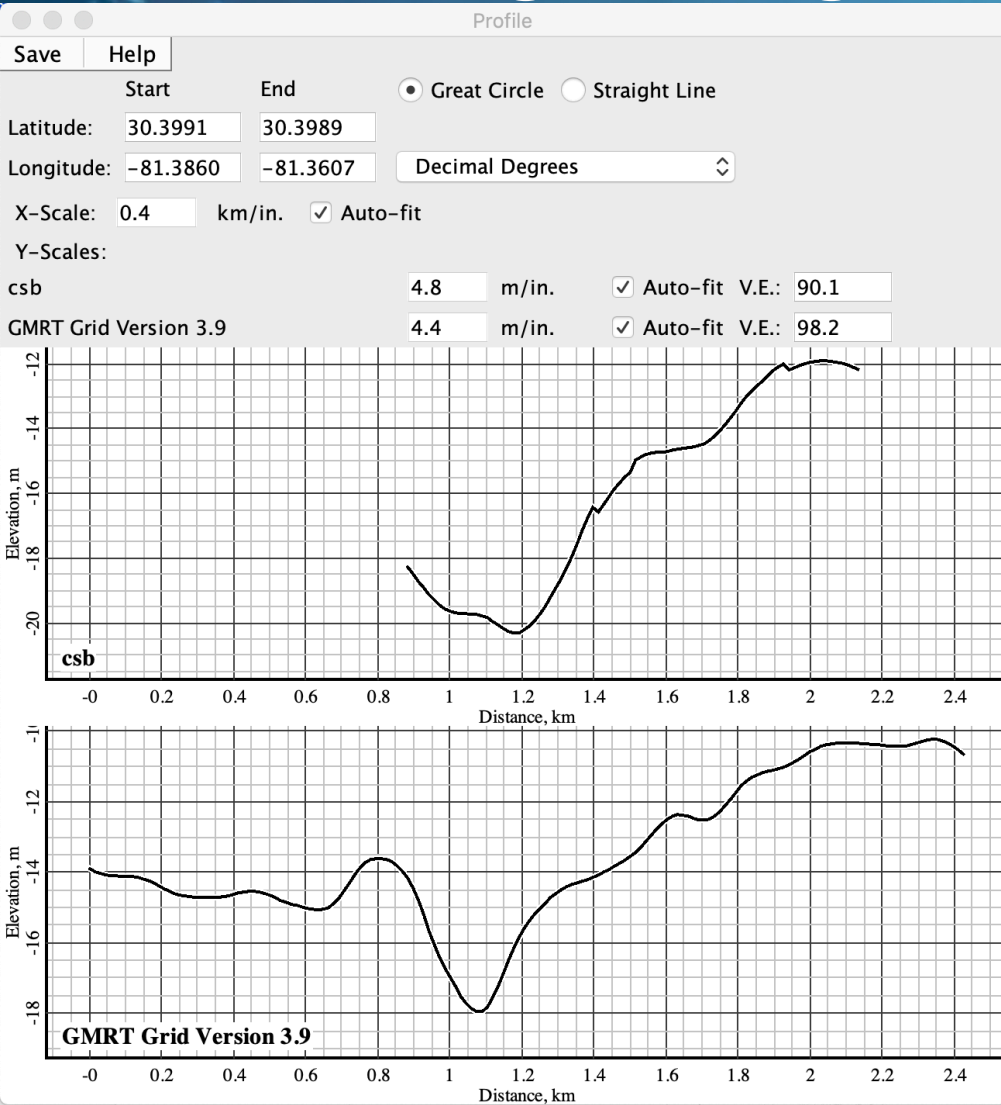
SEABED 2030

Extracting a CSB grid from DCDB



<https://www.geomapapp.org>

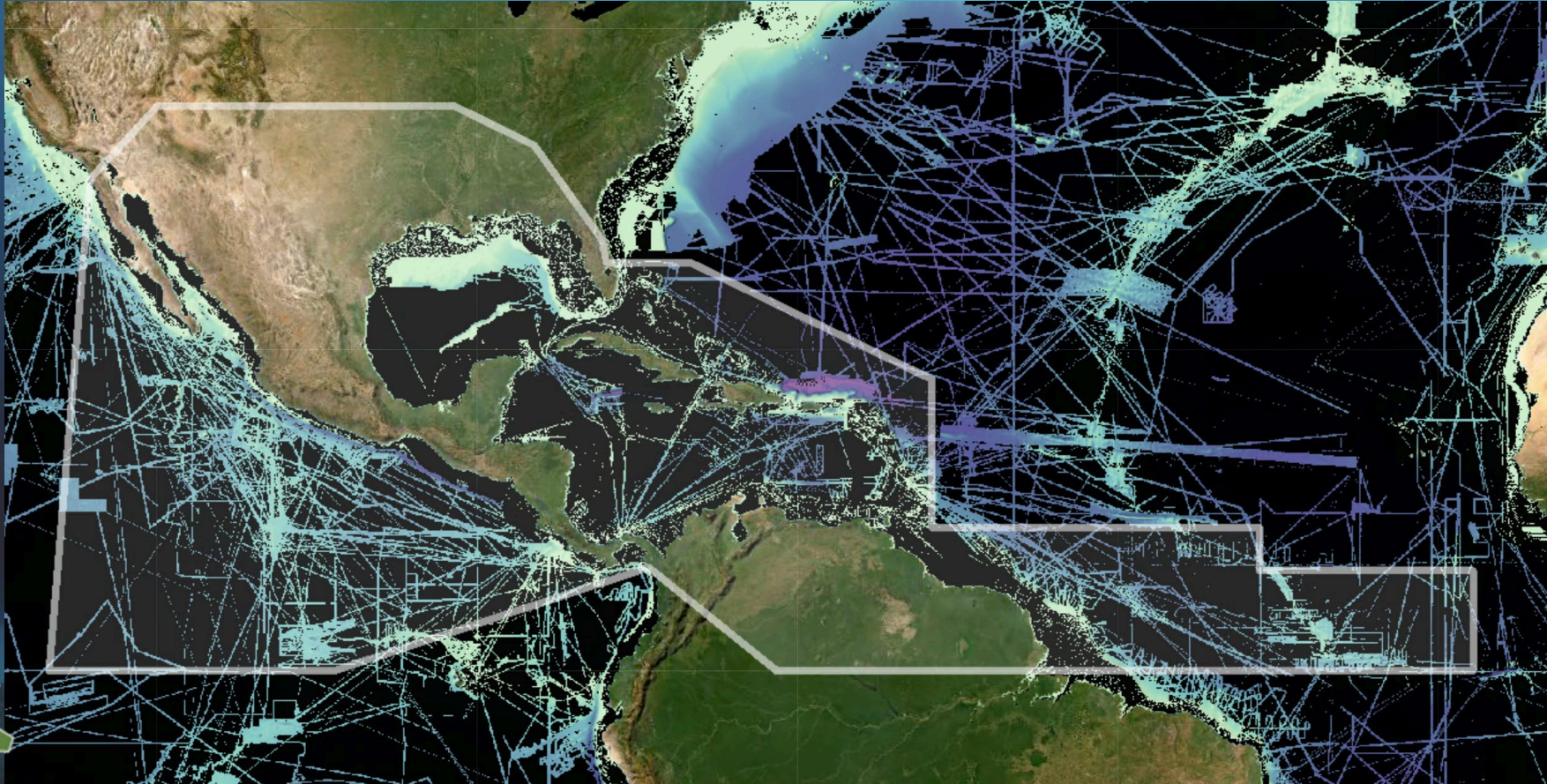
Extracting a CSB grid from DCDB



Questions?



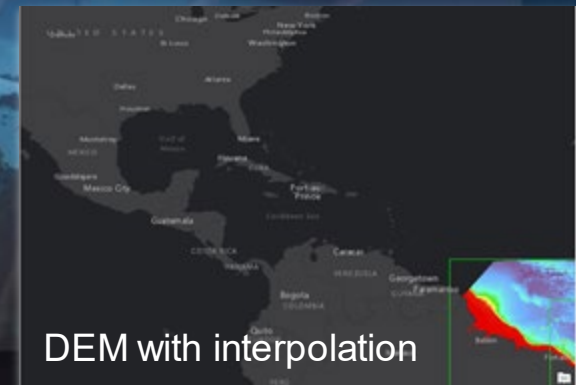
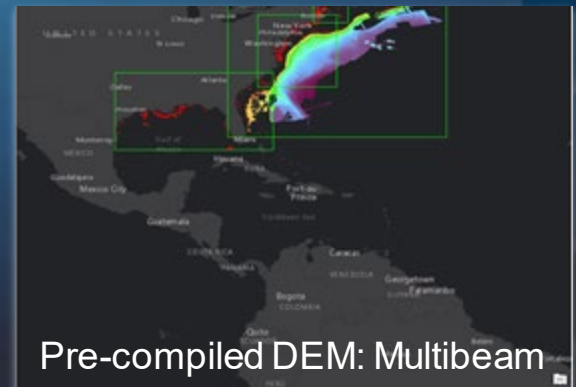
Assembling the Regional Grid

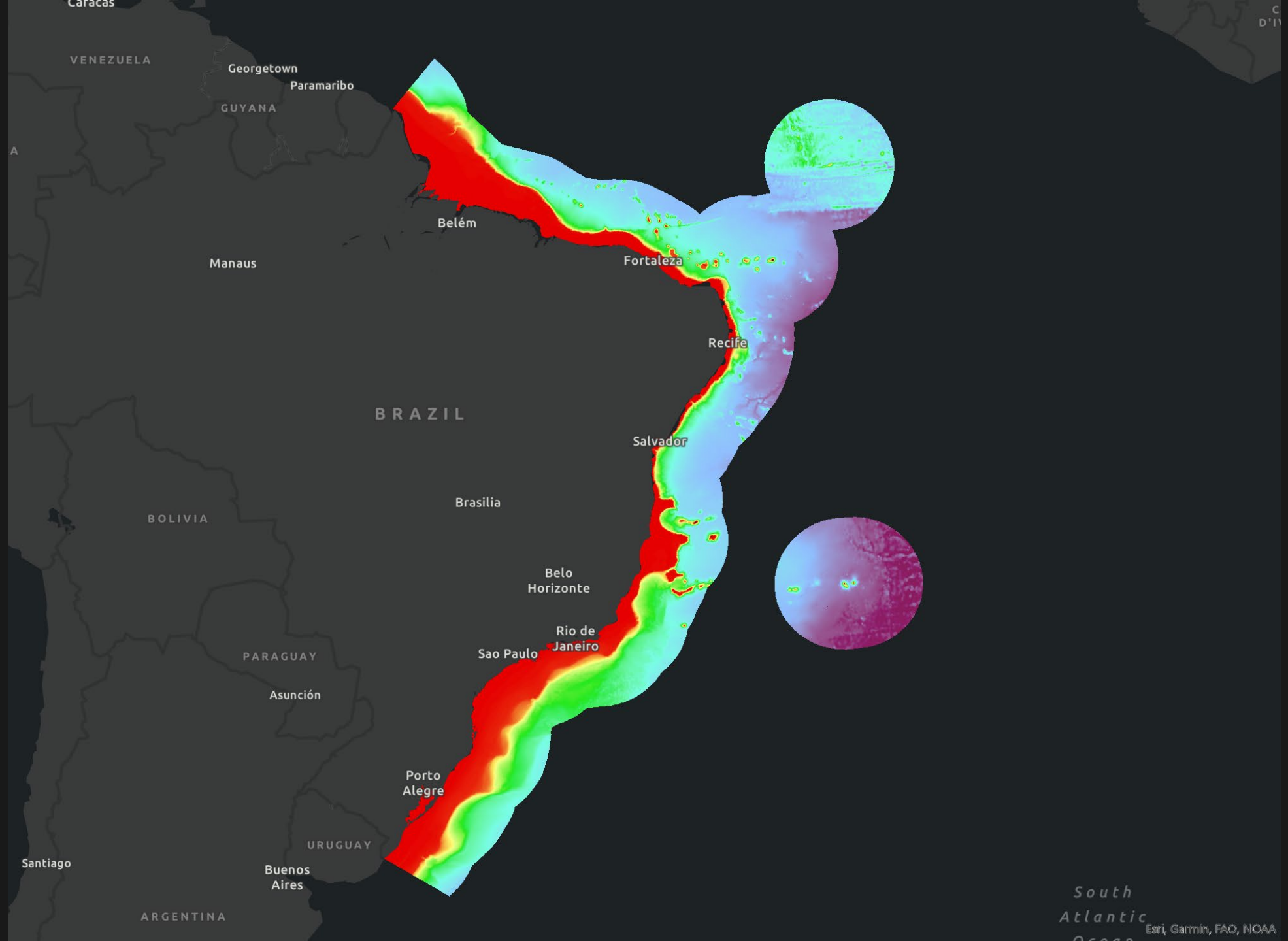


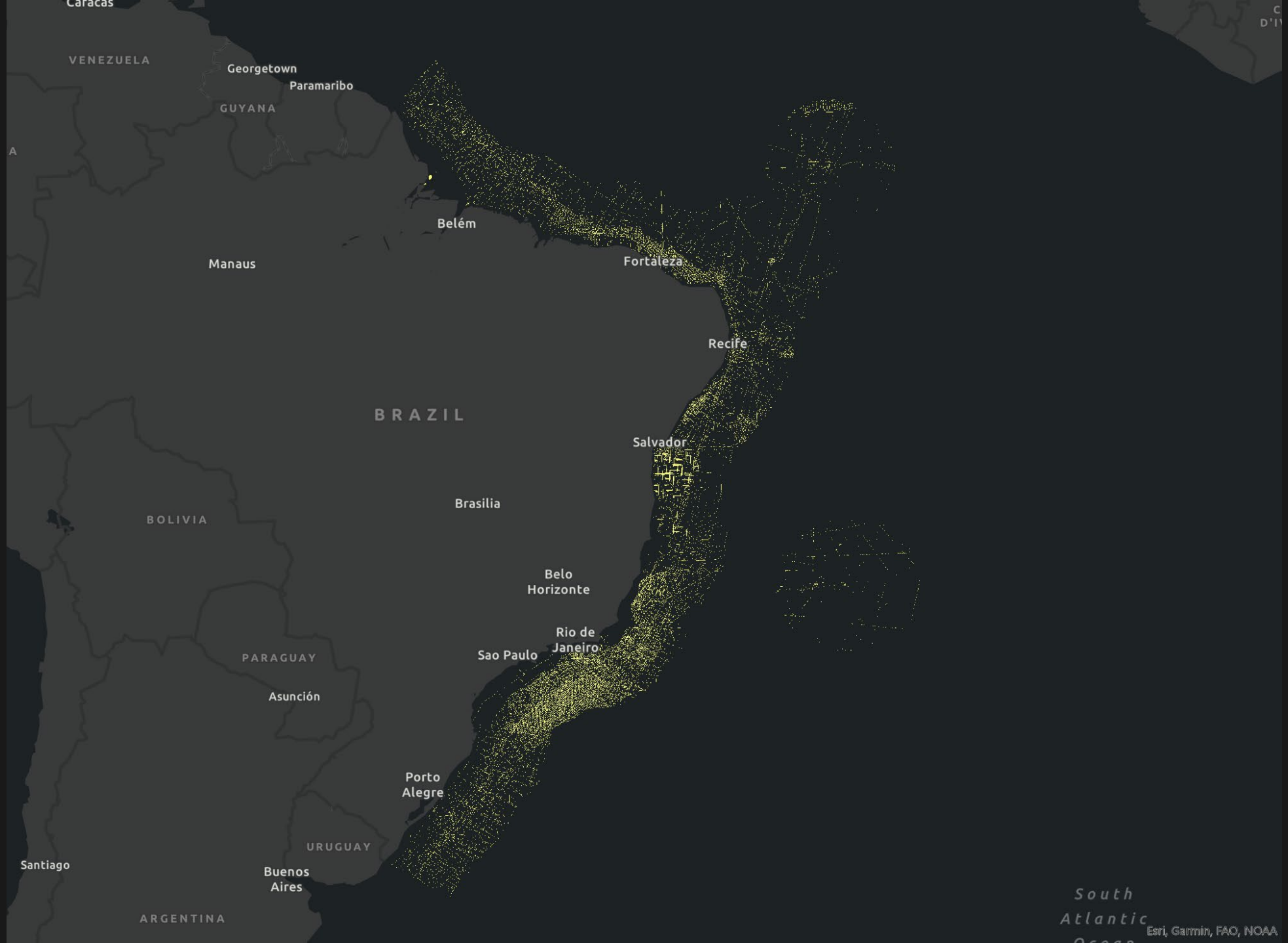
Assembling the Regional Grid

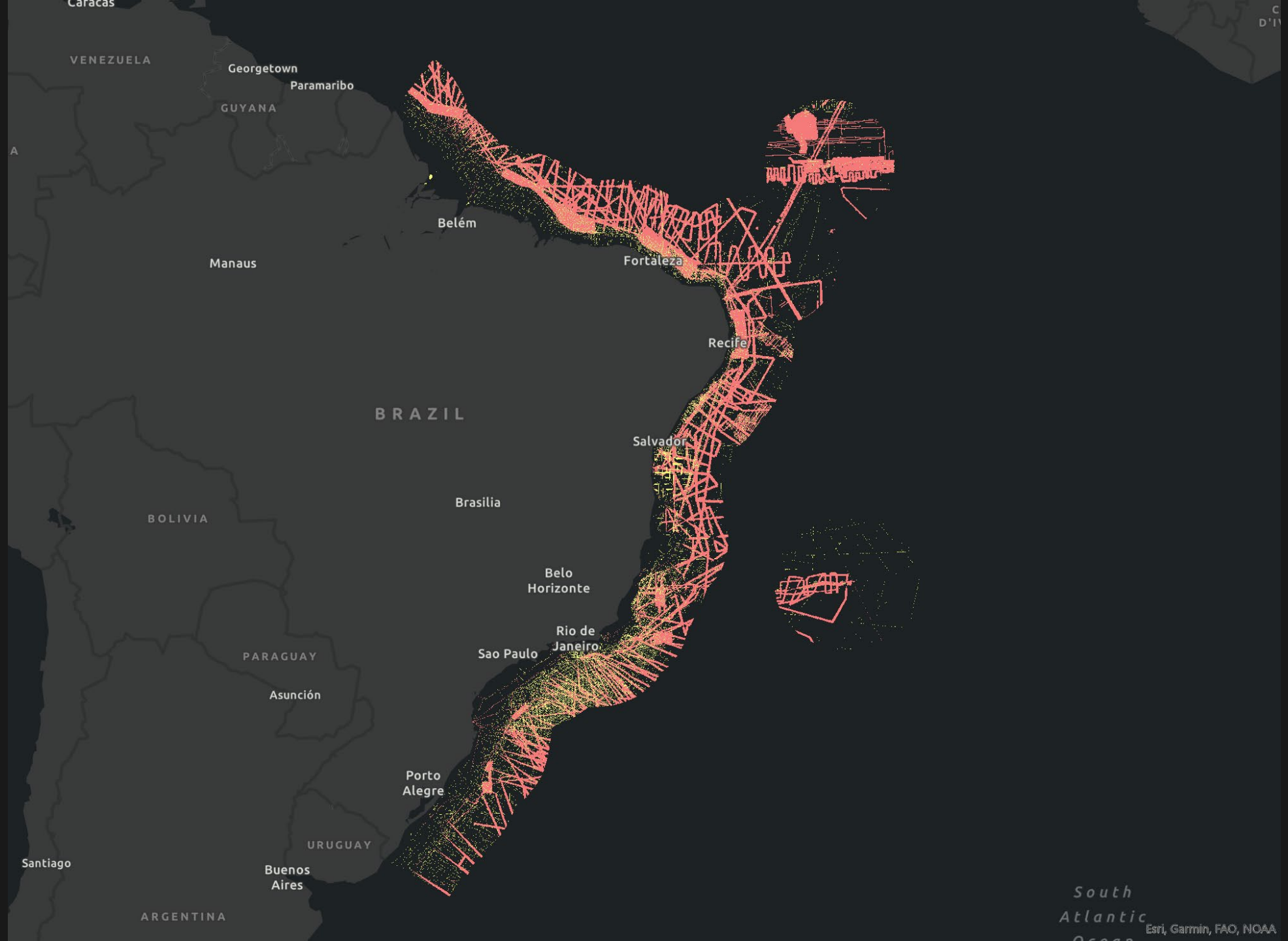
Integrate *gridded* data

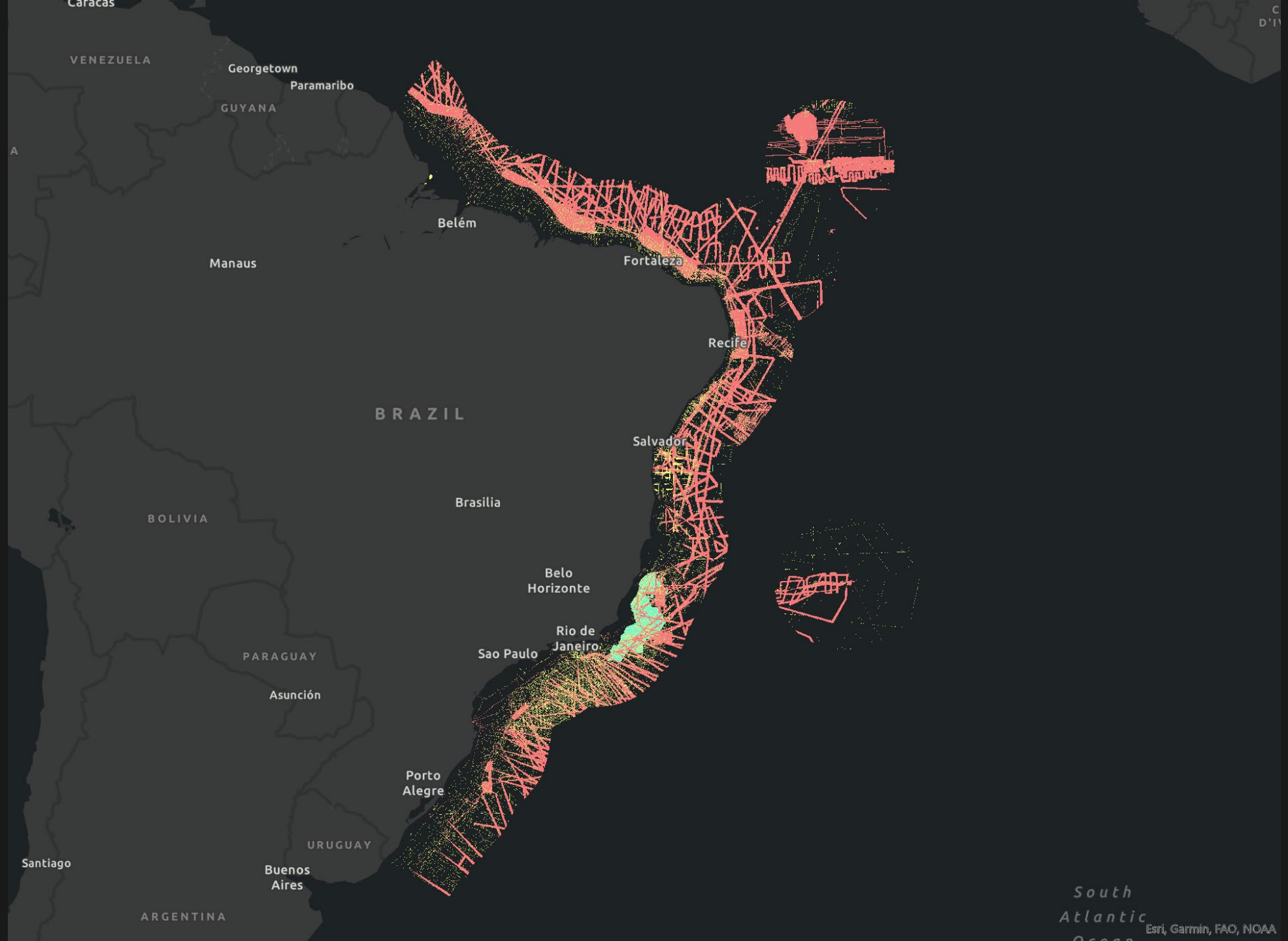
- Variable gridding algorithms
- Swath files
 - cleaned, gridded and blended
- Gridded contributions (DEMs)
 - BAGs, geotiffs, grd
- Sparse data
 - ENC, singlebeam, CSB





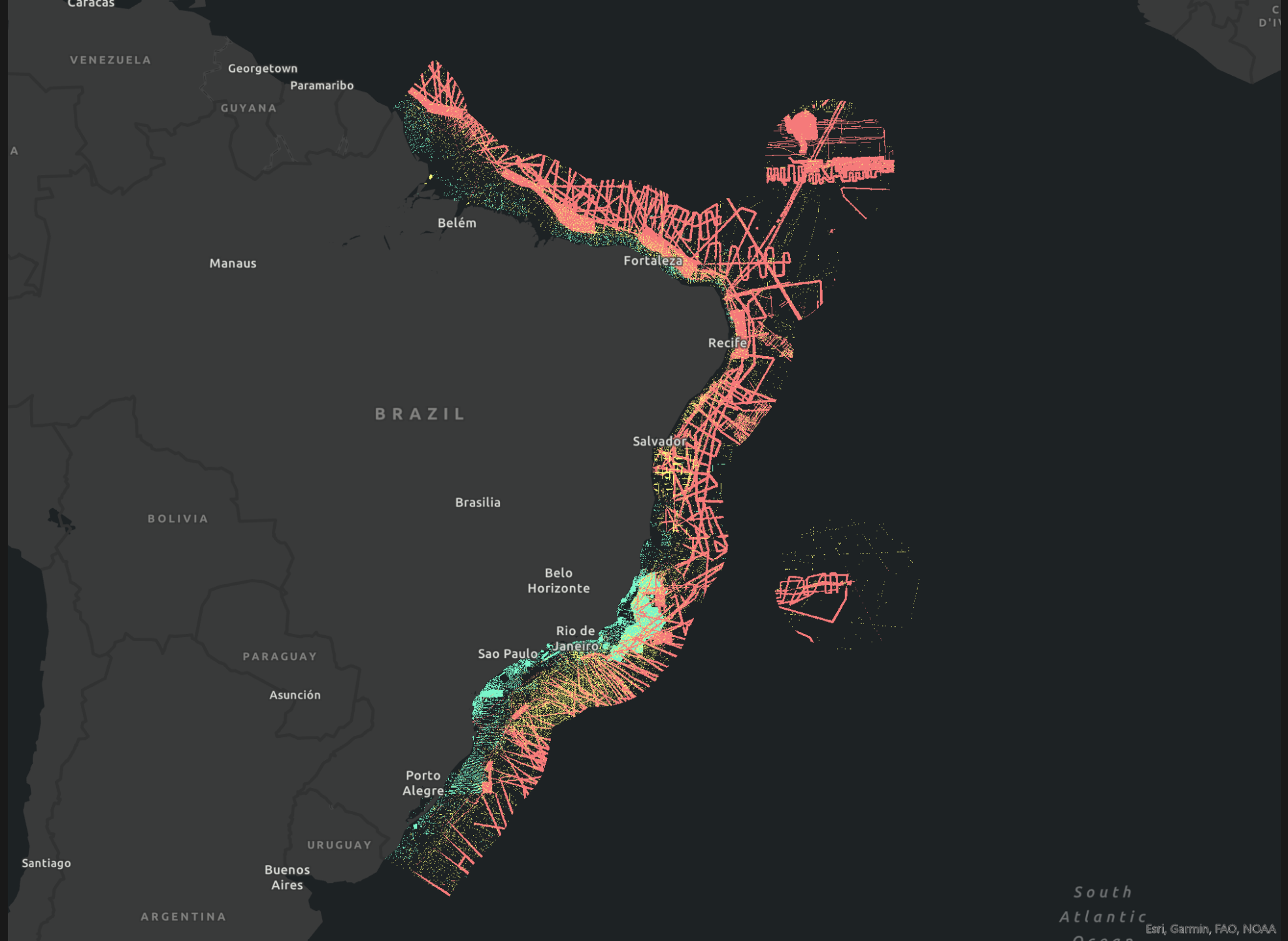


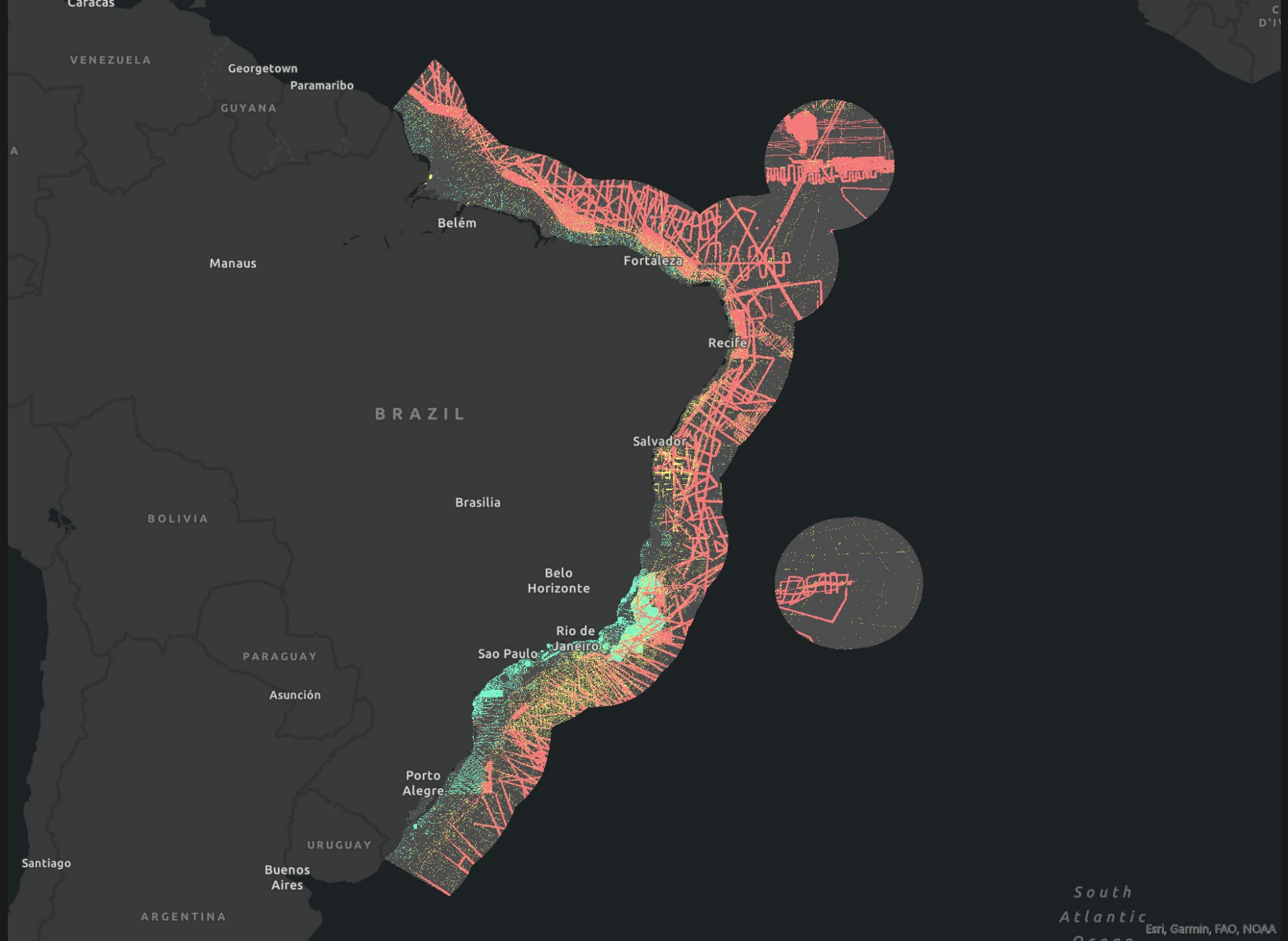


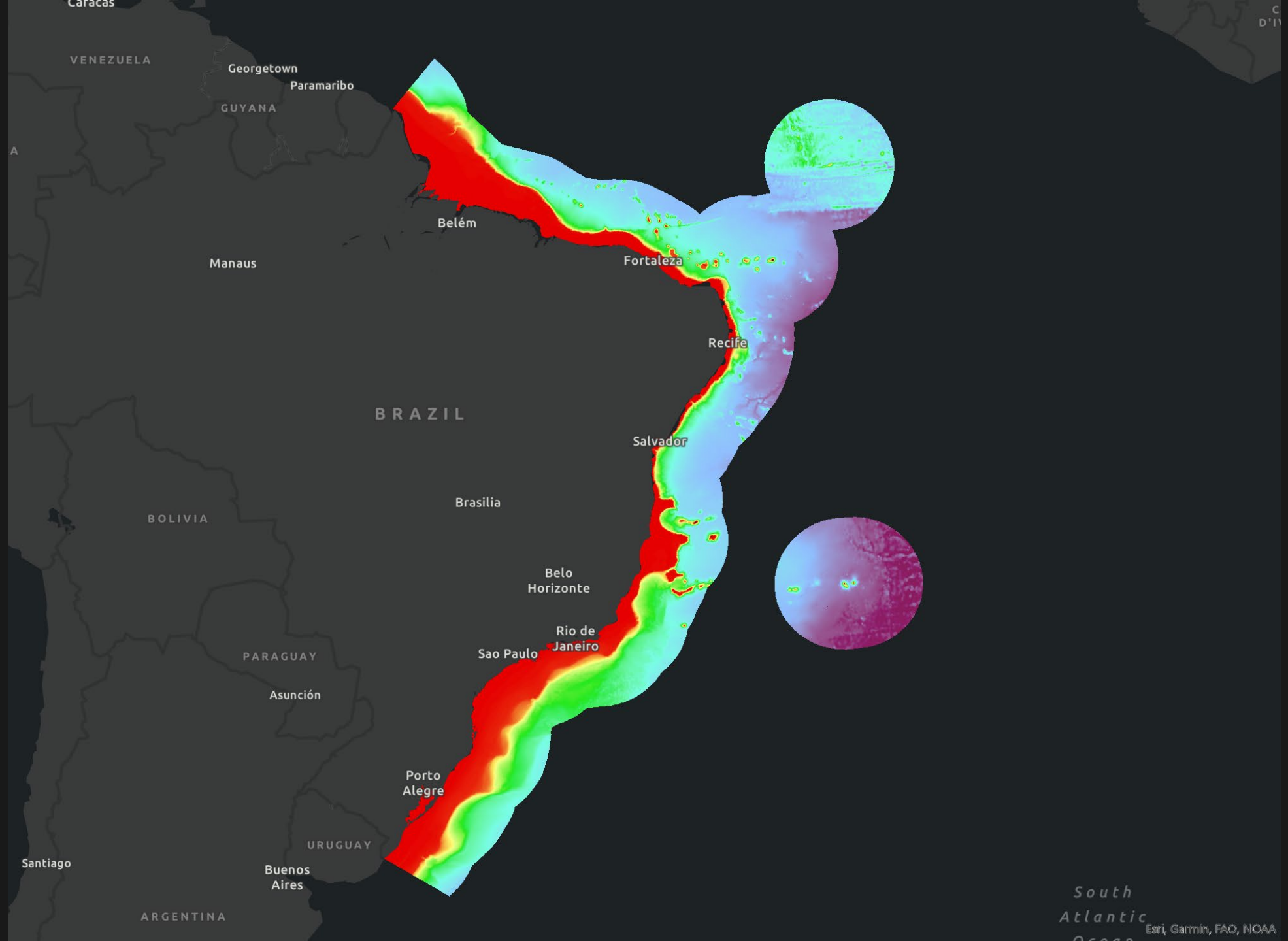


South
Atlantic
Ocean

Esri, Garmin, FAO, NOAA







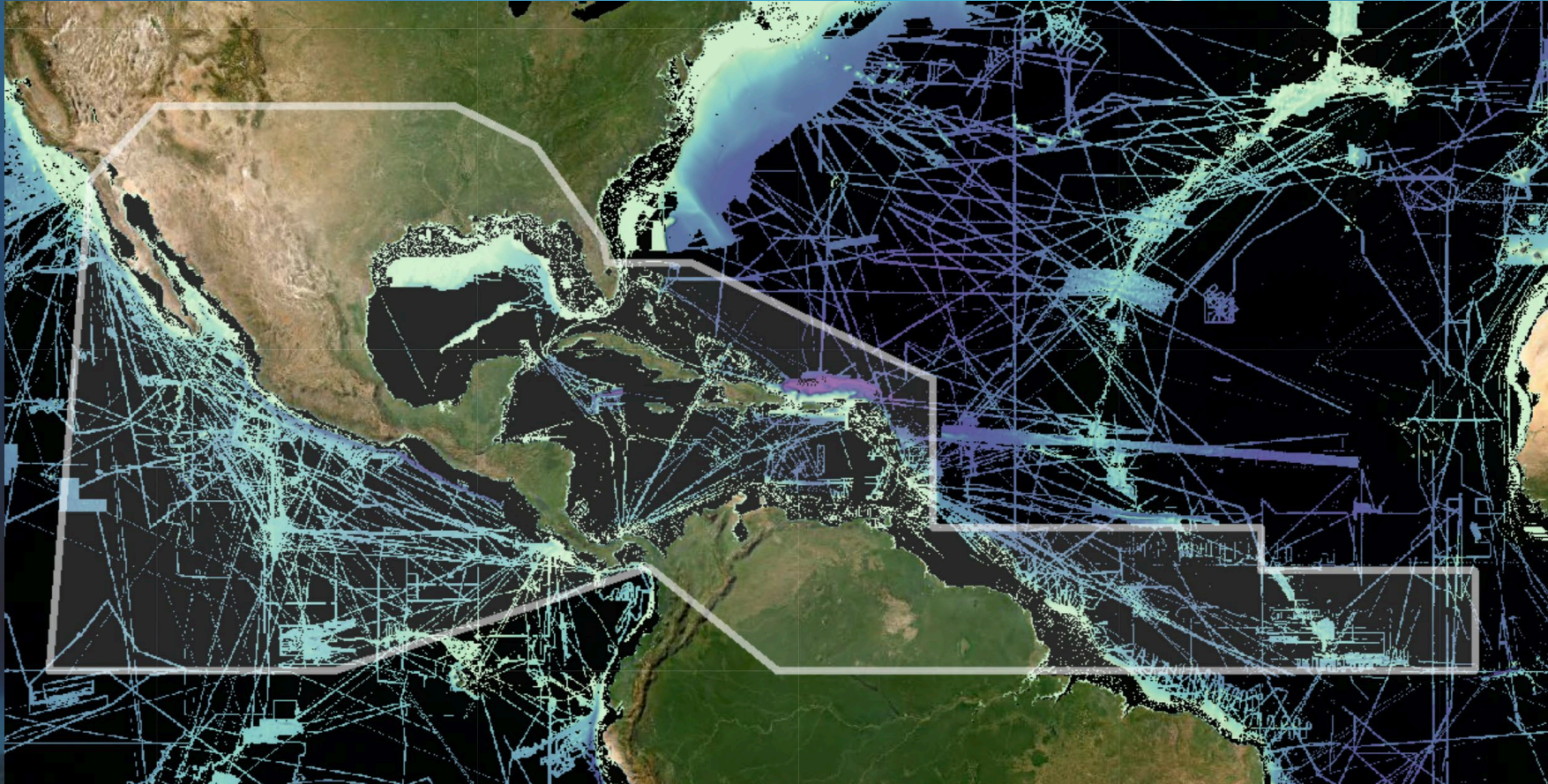
Questions?



Status of Mapping in the MACHC Region



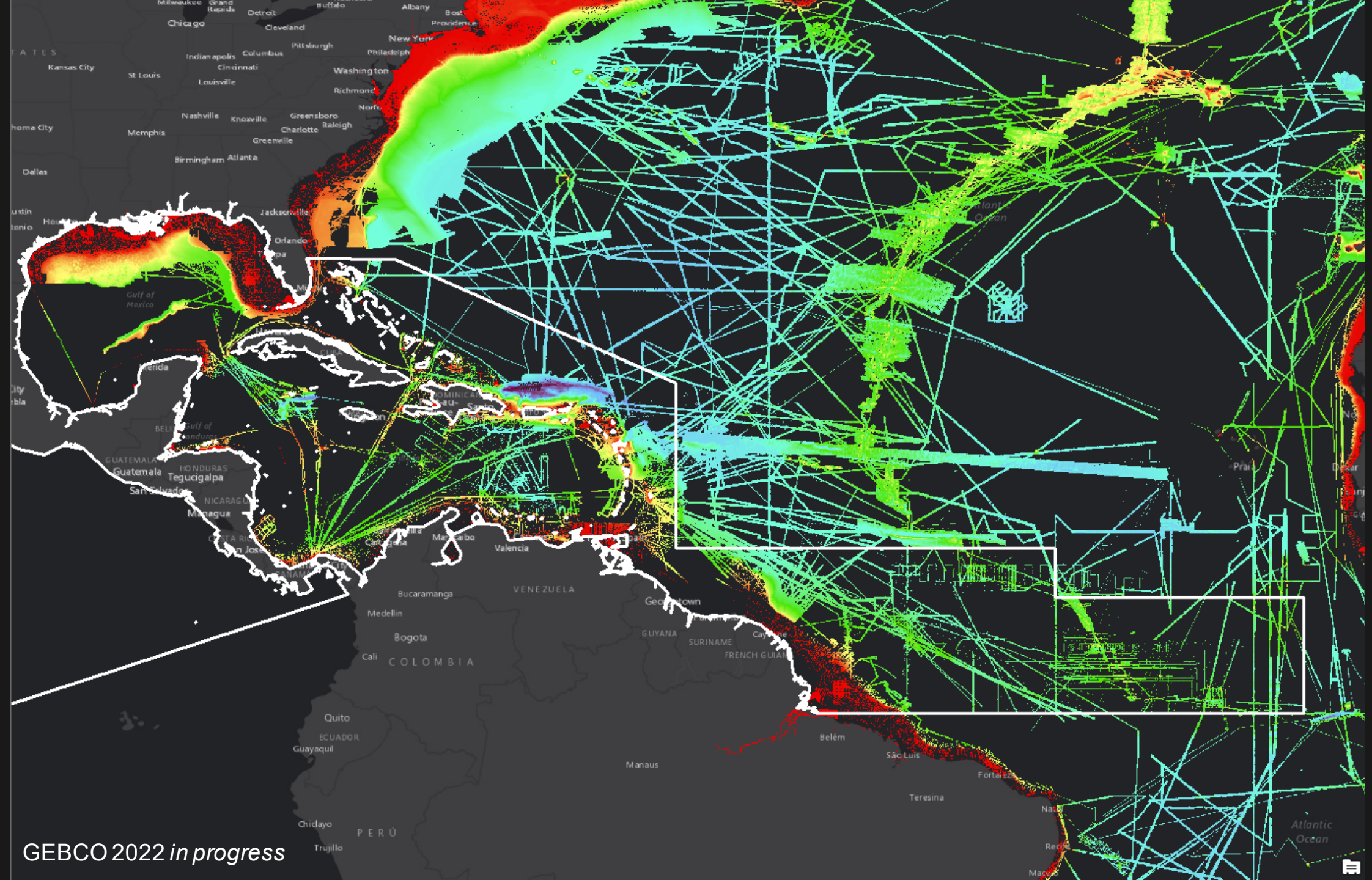
Status of Mapping in the MACHC Region



GEBCO 2020: 20% mapped
GEBCO 2021: **23%** mapped

Thank you to all data contributors!!!





Thank you to all Data Contributors in the MACHC Region!!

- More than 30 gridded data sets *and growing!*
- Data contributions from many organizations within several countries

Brazil, Dominican Republic, France, Germany, Japan, Netherlands, Norway, Russia, USA, Venezuela...



We are here to help!

- Please contact us with:
 - Technical questions
 - Assistance accessing data
 - Data contributions
 - Metadata contributions
 - Suggestions

atlantic-indian@seabed2030.org

