



Overview and GEBCO Mapping Projects

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NOAA Laboratory for Satellite Altimetry (LSA)



Specializes in the application of satellite altimetry to climate and weather related issues, including:

- Global and regional sea level rise
- Coastal and open-ocean circulation
- Weather prediction — from hurricane intensity forecasting to El Niño and La Niña events
- Monitoring the changing state of the Arctic Ocean

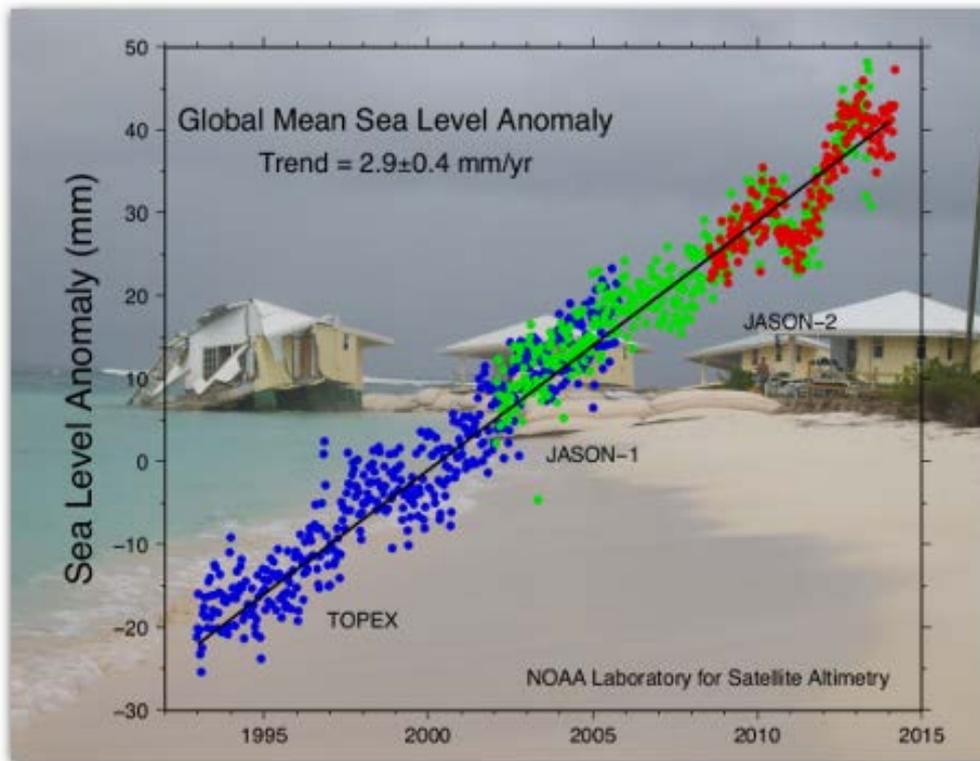


Jason Altimeter Program



- With the launch of Jason-3 in 2016, NOAA and its operational European partner, EUMETSAT, assumed primary responsibility for maintaining the more than 22-year TOPEX/Jason series of high accuracy, global sea level observations used to monitor ocean circulation and sea level rise
- The LSA is the science focal point for the Jason Program within NOAA

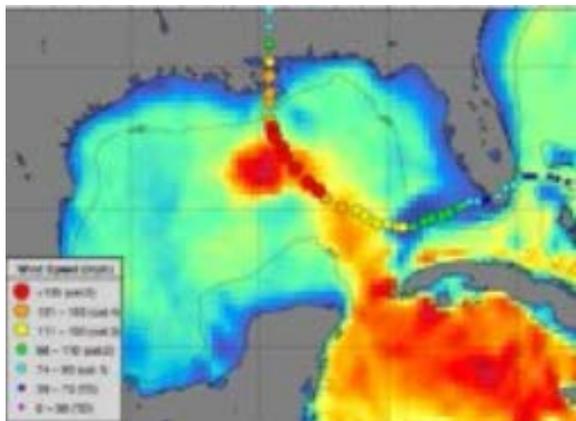
Sea Level Rise



- The Jason global mean record shows sea level rising at about 3 mm/year, nearly twice as fast as during the last century
- Research into the causes of sea level rise, through the addition of ice melt water, ocean warming (thermal expansion), and changes in ocean circulation is a major Lab activity



Ocean Altimetry: Benefits to the Nation



- Altimetry data are used for:
 - Hurricane forecasting
 - High wave warnings
 - Seasonal weather forecasting
 - Fisheries management
 - Ocean hypoxia dead zones
 - Search and rescue
 - Off-shore operations
 - Oil spill response
 - Sea level rise
 - Fishing services
 - Energy siting purposes

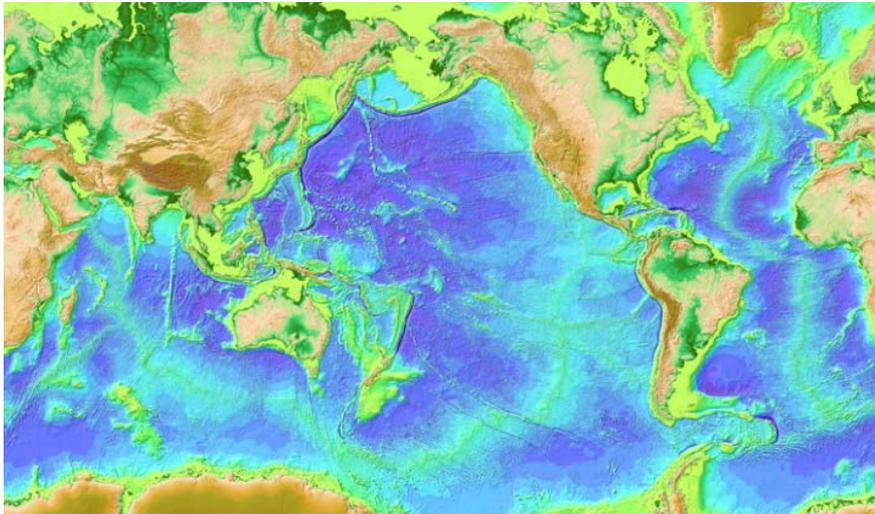


Arctic Sea Ice

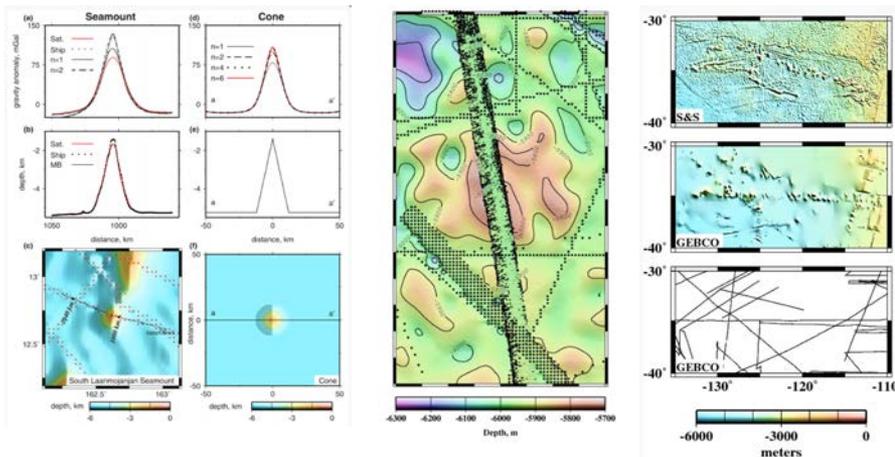


- The Arctic has been experiencing historic declines in sea ice thickness and extent over the past decade
- The LSA Sea Ice Team is using data from CryoSat-2 and other altimeter missions to observe seasonal changes in sea ice thickness
- This information is used in sea ice prediction models

Seafloor Bathymetry



- LSA, in collaboration with Scripps Institution of Oceanography, pioneered the use of satellite altimetry to determine the first truly global map of the ocean floor



- Research includes seamount resolution, bathymetric model errors, evaluation of public bathymetry grids, plate reconstructions



What is GEBCO?

The General Bathymetric Chart of the Oceans (GEBCO), www.gebco.net:

- Aims to provide the most authoritative, publicly-available bathymetric data sets for the world's oceans
- Operates under the joint auspices of the International Hydrographic Organization (IHO) and the Intergovernmental Oceanographic Commission (IOC) of UNESCO
- Has a Guiding Committee, 3 Sub-Committees, plus ad hoc working groups:
 - Technical Sub-Committee on Ocean Mapping (TSCOM)
 - Sub-Committee on Regional Undersea Mapping (SCRUM)
 - Sub-Committee on Undersea Feature Names (SCUFN)
 - Working groups include Outreach and the IHO-IOC GEBCO Cook Book

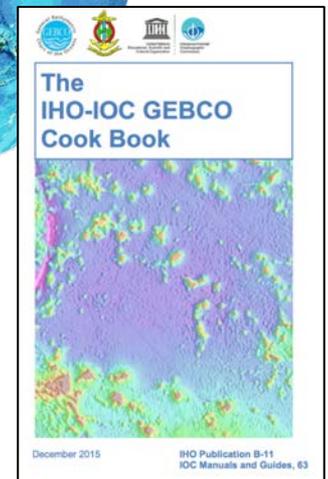
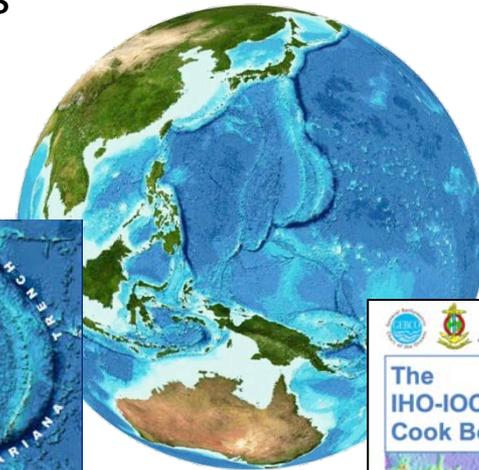


GEBCO Activities

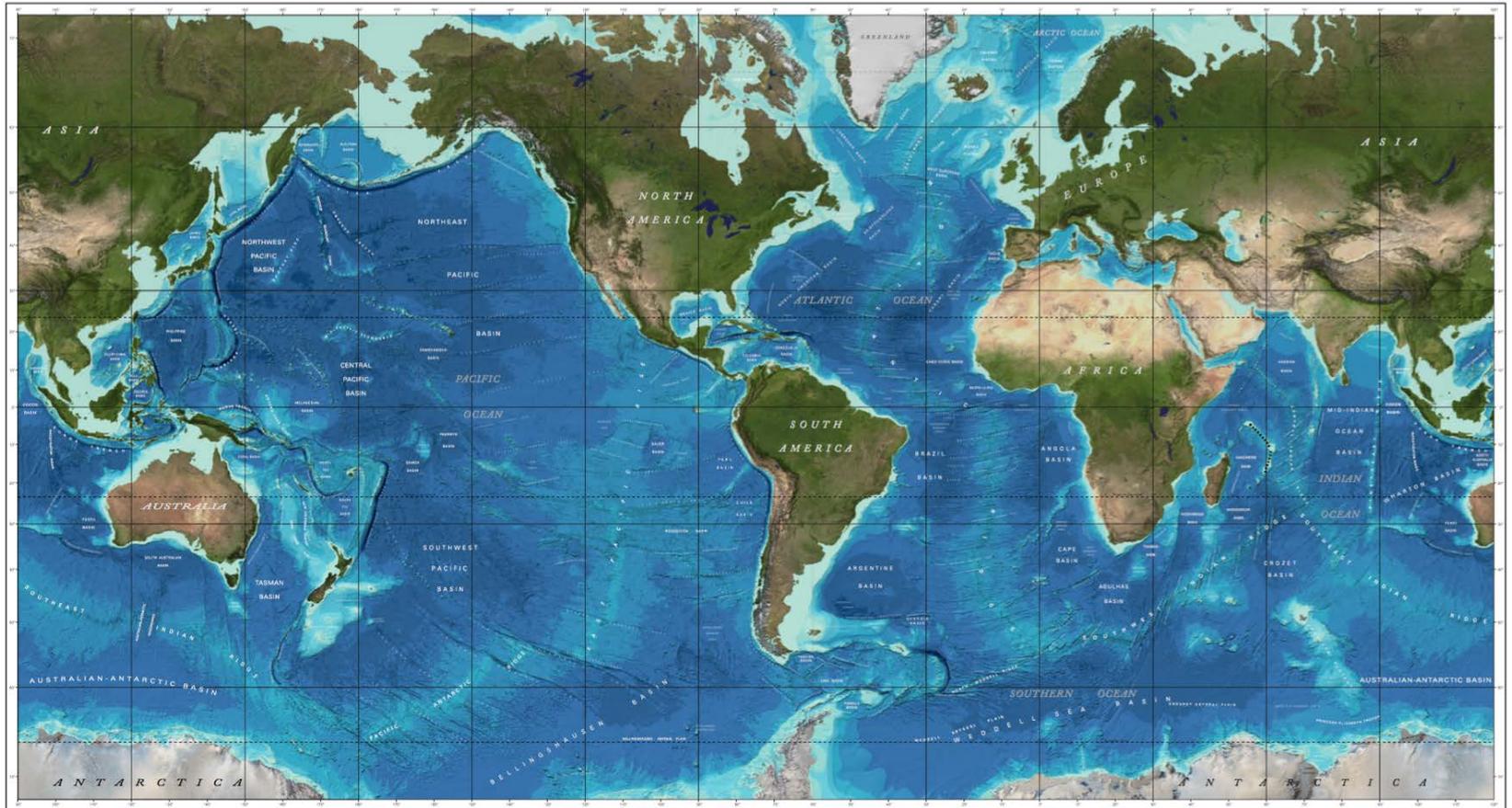
- Nippon Foundation – GEBCO Seabed 2030 Project
- Produce a range of bathymetric data sets and products
- Encourage contributions of bathymetric survey data
- Crowd-Sourced Bathymetry Working Group initiative
- Shallow water bathymetry data from ENCs initiative
- Nippon Foundation/GEBCO Training Project
- IHO-IOC GEBCO Cook Book
- GEBCO Bathymetric Science Day

GEBCO's Data Sets and Products

- Global gridded bathymetric data set (30 arc-second interval) and SID grid
- GEBCO Gazetteer of Undersea Feature Names
- GEBCO Digital Atlas
- Grid viewing software
- Printable maps
- Web Map Service (WMS)
- IHO-IOC GEBCO Cook Book

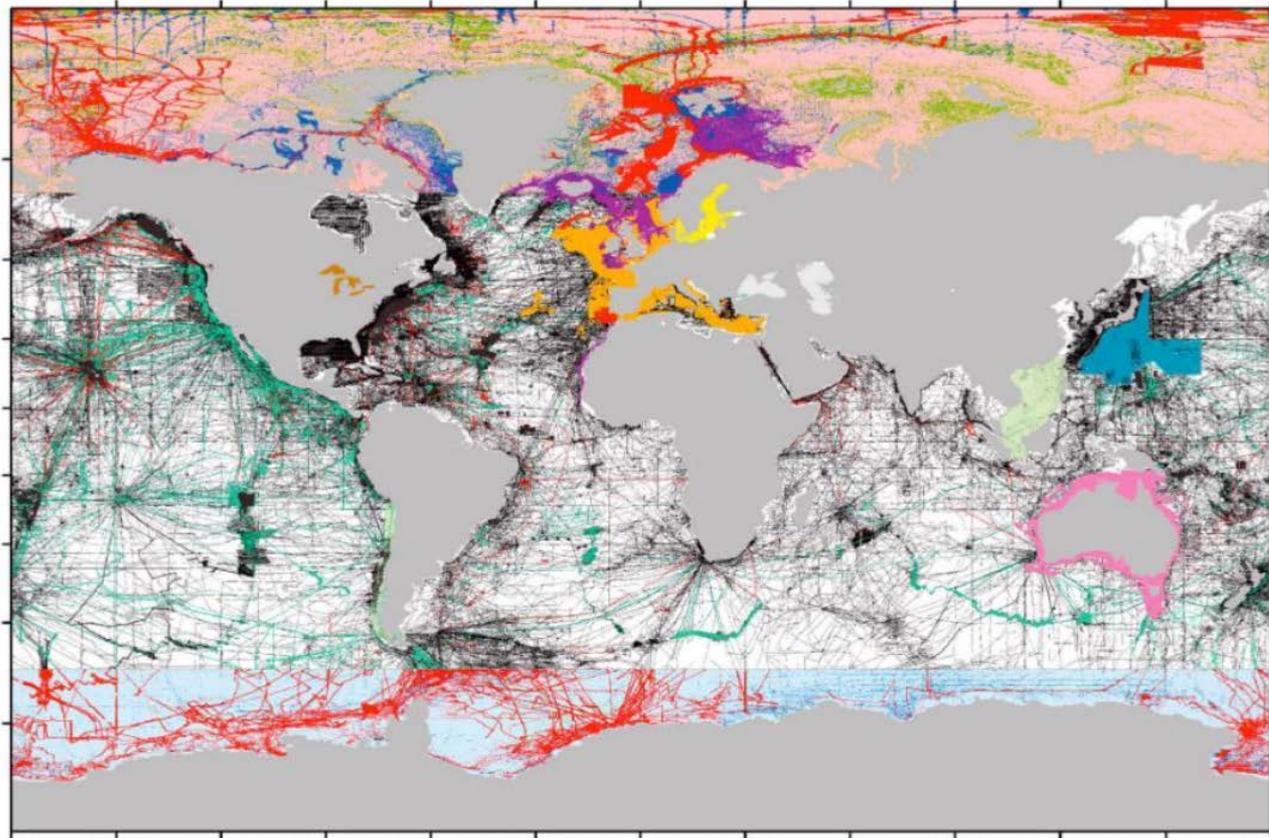


GEBCO_2014 Grid



- 30 arc-second global grid of elevations
- Combines ship depth soundings and depths predicted from satellite altimetry

Nippon Foundation – GEBCO Seabed 2030 Project

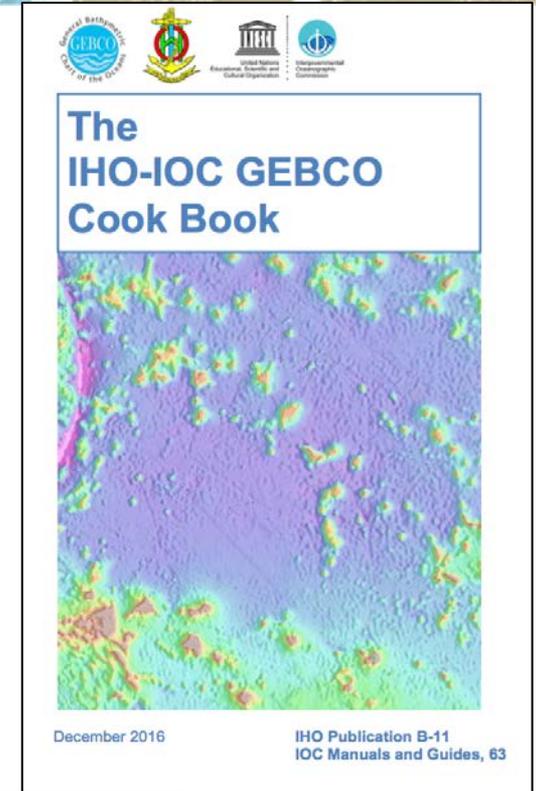


- Only 18 % of GEBCO_2014 grid cells are based on depth soundings
- Goal is to facilitate complete mapping the entire ocean floor by year 2030

IHO-IOC GEBCO Cook Book

At the 2009 GEBCO 25th Meeting of TSCOM, the “Cook Book Working Group” was formed to “create a manual that enables users to prepare and grid data for inclusion in GEBCO products,” resulting in:

- IHO-IOC GEBCO Cook Book:
 - IHO Publication B-11 (April, 2012)
 - IOC Manuals and Guides, 63 (Oct. 2012)
 - EOS “News Brief” announcing Cook Book was published in EOS Trans. AGU, Feb. 2013
 - Article in Hydro Int’l (April, 2014) highlighted Cook Book
- Used as educational resource, including:
 - UNH CCOM/JHC Ocean Mapping classes
 - Texas A&M University
 - Workshops
 - Used internationally
- Available for Download: <http://www.gebco.net>
- Citation format is published on GEBCO website
- **Currently being updated, always seeking new contributed materials**



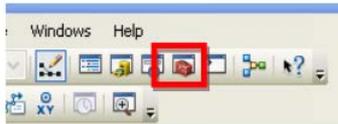
IHO-IOC GEBCO Cook Book

Chart Adequacy Chapter

An undocked *Spatial Analyst* toolbar will appear. Dock it next to the upper toolbars.



Activate the **Toolbox** by clicking on the icon in the upper toolbar.



Site: Ft. Myers, FL, USA

Compiler: John Doe

Date: 1 November 2015

Supervisor: Thomas Jefferson

Date: 5 November 2015

Data Sources

Raster charts: 11425
11427

Electronic Charts: US4FL19M
US4FL42M

Satellite imagery date (sensor): 15 March, 2015
(Landsat 8)

Dates of AIS data: July, 2012 to June, 13

	Number of pixels	Area (Km ²) (1 pixel = 0.0009 Km ²)
Total charted area:	113,060	101.75
Adequate for navigation	83,021	74.72
Inadequate for navigation	30,039	27.03
Percentage of adequate area	26%	26%

Schematic overview



- The Advanced Topics section includes Chapter 14.0 on the Nautical Chart Adequacy Procedure
- Illustrated step-by-step instructions enable users to easily follow a long series of steps to produce a Chart Adequacy Review
- Contributed by Klemm, Pe'eri, and others