

THE NIPPON FOUNDATION-GEBCO

SEABED  
2030

# International Bathymetric Chart of the Southern Ocean

Patrick Schwarzbach  
on behalf of the IBCSO team



IBCSO Business Meeting at SCAR OSC 2024 in Pucón, Chile

17.08.2024

# Bathymetry Working Group at AWI



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# IBCSO v2

scientific data

OPEN DATA DESCRIPTOR

## The International Bathymetric Chart of the Southern Ocean Version 2

Boris Dorschel et al.\*

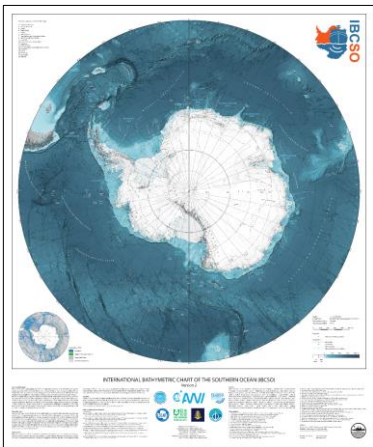
The Southern Ocean surrounding Antarctica is a region that is key to a range of climatic and oceanographic processes with worldwide effects, and is characterised by high biological productivity and biodiversity. Since 2013, the International Bathymetric Chart of the Southern Ocean (IBCSO) has represented the most comprehensive compilation of bathymetry for the Southern Ocean south of 50°S. Recently, the IBCSO Project has continued its efforts with the Nippon Foundation – GEBCO Seabed 2030 Project supporting the goal of mapping the world's oceans by 2030. New datasets initiated a second version of IBCSO (IBCSO v2). This revision extends to 90°S (covering approximately 2.5 times the area of seafloor of the previous version) including the gateways of the Antarctic Circumpolar Current and the Antarctic circumpolar frontal systems. Due to increased multi-beam data coverage, IBCSO v2 significantly improves the overall representation of the Southern Ocean seafloor and includes many additional bathymetry in more detail. This status IBCSO v2 the most authoritative seafloor map of the area south of 50°S.

**Background & Summary**  
The Southern Ocean is a major component of the coupled ocean-atmosphere-climate system and includes the largest oceanic carbon stores, the Antarctic Circumpolar Current (ACC), 5% of the world's most important ocean regions for the cycle of endogenous CO<sub>2</sub> and heat from the atmosphere, and cold and downwelling water masses in the deepening Southern Ocean. The area of the Southern Ocean with Antarctic glacier and ice shelves are the main drivers of present, past, and future Antarctic ice sheet evolution and their role and impact on global climate system. The Southern Ocean is high productivity area with high biomass. The Southern Ocean is also one of the most remote and least visited of the world with extensive sea ice cover and poor resolution weather conditions. Despite its oceanic and bathymetric features, Southern Ocean is largely uncharted (with the latest part of the world seafloor including seamounts, ridges, and trenches). Public bathymetry information is provided for the International Bathymetric Chart of the Southern Ocean (IBCSO) and the Digital Bathymetry Model of the Drake Passage (DBM-BATHYMAP) are presented to better understand the Southern Ocean and the response of its hydrography and composition and management systems. IBCSO v2 provides the most comprehensive compilation of bathymetry data for the region. IBCSO was initiated in 2008 with the first version published by a total of 20 institutions. The scientific equivalent of the International Bathymetric Chart of the Arctic Ocean (IBCAO), which was originally published in 2006 and recently revised in 2017, both versions are high resolution products of the General Bathymetric Chart of the Oceans (GEBCO) IBCSO is produced as the equivalent of the International Hydrographic Organization (IHO) and the International Geographical Commission (IGC) with the goal to produce the authoritative map of the world's oceans. Furthermore, IBCSO has continued its efforts with and is supported by the Nippon Foundation – GEBCO Seabed 2030 Project (founded in 2017 by the Nippon Foundation and GEBCO). The IBCSO Project is also an integral part of the Antarctic research centre's sea ice support group of the Antarctic Conservation Antarctic Research Society.

IBCSO v2 is restricted to the Antarctic. The new area covering the area south of 50°S with a resolution of 30 m is a first hydrographic publication. Following the release of Version 1, the user community expressed the wish for an IBCSO revision to 50°S to cover the entire ACC and the Antarctic circumpolar frontal systems. This request, the generalised need for bathymetry information of the Southern Ocean, and the

\*Full list of authors and their affiliations appears at the end of the paper.

SCIENTIFIC DATA | DOI:10.1038/s41598-022-10208-7

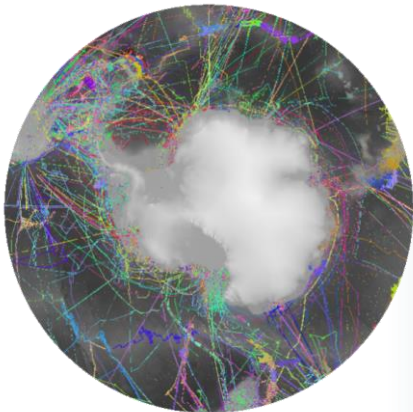


| Product      | URL                                 | Area         | Scale     | Resolution | Depth        | Depth Range  | Depth Unit | Depth Interval | Depth Accuracy | Depth Reference |
|--------------|-------------------------------------|--------------|-----------|------------|--------------|--------------|------------|----------------|----------------|-----------------|
| IBCSO v2     | https://www.ibcsoscientificdata.org | 50°S to 90°S | 1:100,000 | 30m        | 0 to 10,000m | 0 to 10,000m | m          | 1m             | ±1m            | IGLD65          |
| IBCSO v1     | https://www.ibcsoscientificdata.org | 50°S to 90°S | 1:100,000 | 30m        | 0 to 10,000m | 0 to 10,000m | m          | 1m             | ±1m            | IGLD65          |
| DBM-BATHYMAP | https://www.ibcsoscientificdata.org | 50°S to 90°S | 1:100,000 | 30m        | 0 to 10,000m | 0 to 10,000m | m          | 1m             | ±1m            | IGLD65          |
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Published 07 June  
2022

Who would like to  
have a poster?

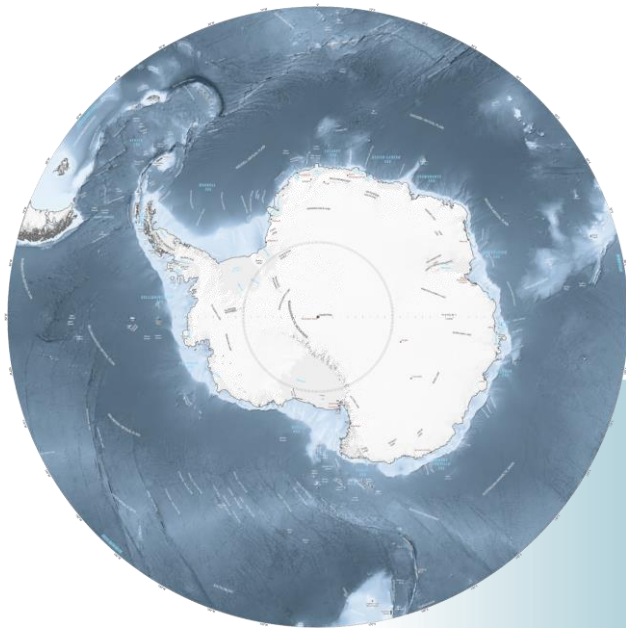
## — Status of seabed mapping



Prerelease of the regional identifier  
(RID) grid

- Data coverage south of 50°S (August 2024)
- 106 organizations in 23 countries
- ~25% coverage at 500m resolution in IBCSO projection (EPSG9354)
- Large spatial differences in data coverage
- Improved metadata

Preliminary results



Prerelease of the DEM

11<sup>th</sup> SCAR OPEN SCIENCE CONFERENCE  
 PUNTA CHILE, 19-21 AUGUST 2024  
[www.ices2024.org](http://www.ices2024.org)

## International Bathymetric Chart of the Southern Ocean

Antarctic Bathymetric Chart (ABC), Southern Ocean Bathymetric Chart (SOBC), and Antarctic Bathymetric Chart (ABC) are the main products of the International Bathymetric Chart of the Southern Ocean (IBCO) project.

The Southern Ocean and adjacent waters surrounding Antarctica show a range of diverse and complex processes with great effects. The region is also considered to be high biological productivity. Since 2015, the International Bathymetric Chart of the Southern Ocean (IBCO) project has been working to produce the most complete and accurate bathymetric chart of the Southern Ocean. The IBCO project is a regional implementation of the International Bathymetric Chart of the Ocean (IBCO).

IBCO is a project of the International Oceanographic Commission (IOC) and the International Hydrographic Organization (IHO). The IBCO project is a regional implementation of the International Bathymetric Chart of the Ocean (IBCO).

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IBCO covers the Southern Ocean and adjacent waters south of 50° S, offers a historical depth coverage of 500 m and more than 1000 m depth coverage. The IBCO project is a regional implementation of the International Bathymetric Chart of the Ocean (IBCO).

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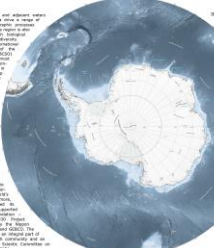


Figure 1: Elevation grid south of 50°S

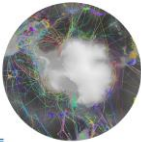


Figure 2: Depth contour grid

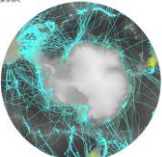


Figure 3: Bathymetric grid

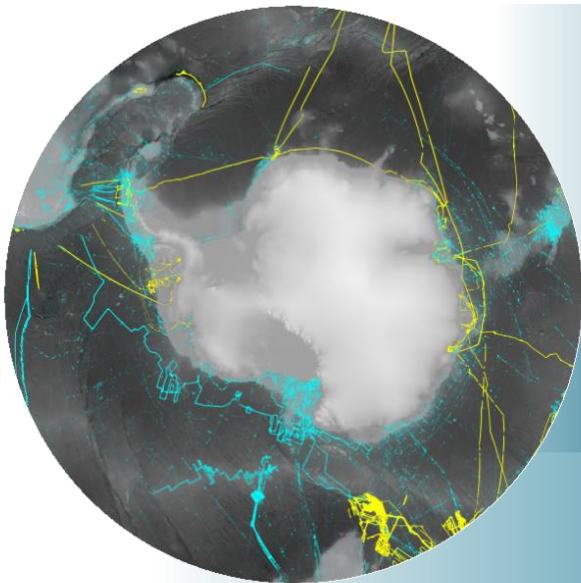
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# — IBCSO 2024 vs Version 2

Singlebeam  
181



Multibeam  
44

Preliminary results  
Buffered Coverage

SECTION 01

# German Mapping Activities (May 2022 to April 2024)

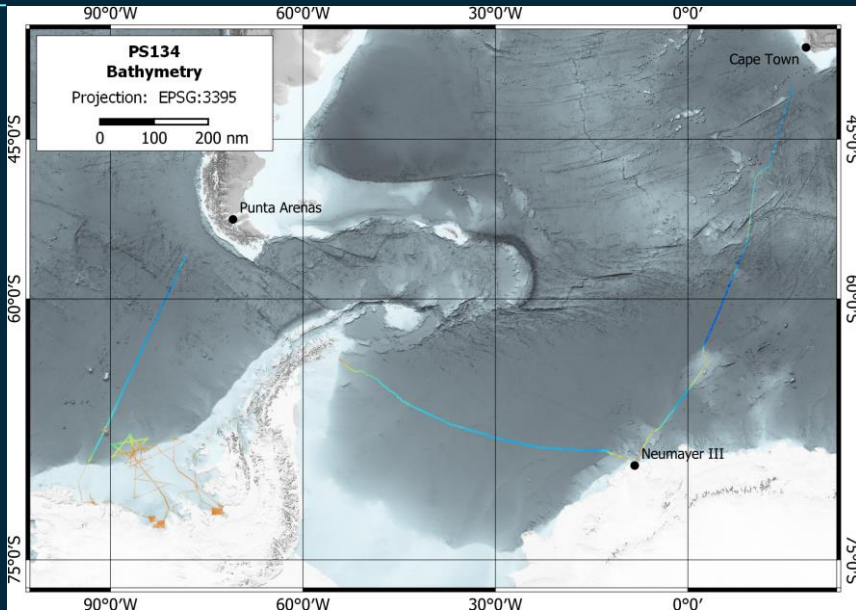


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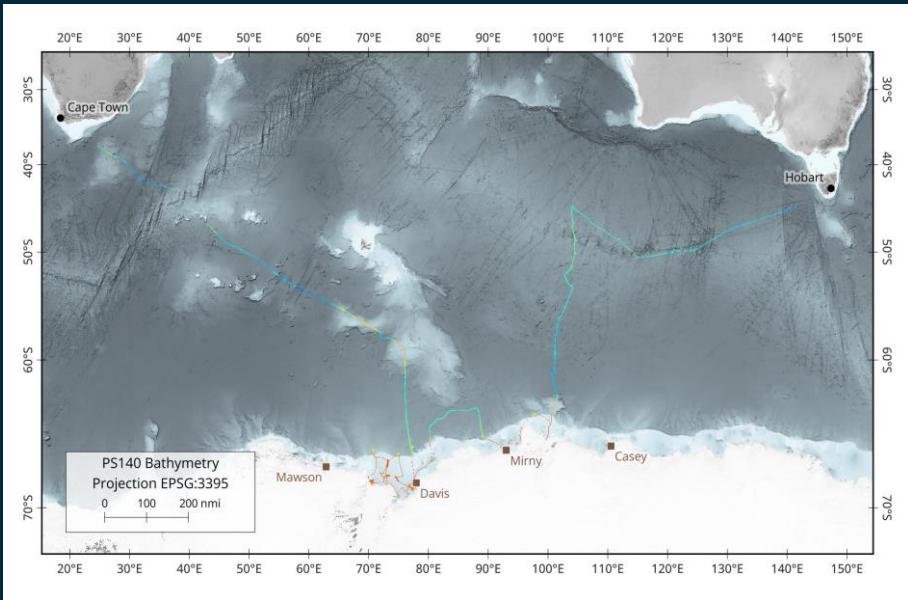


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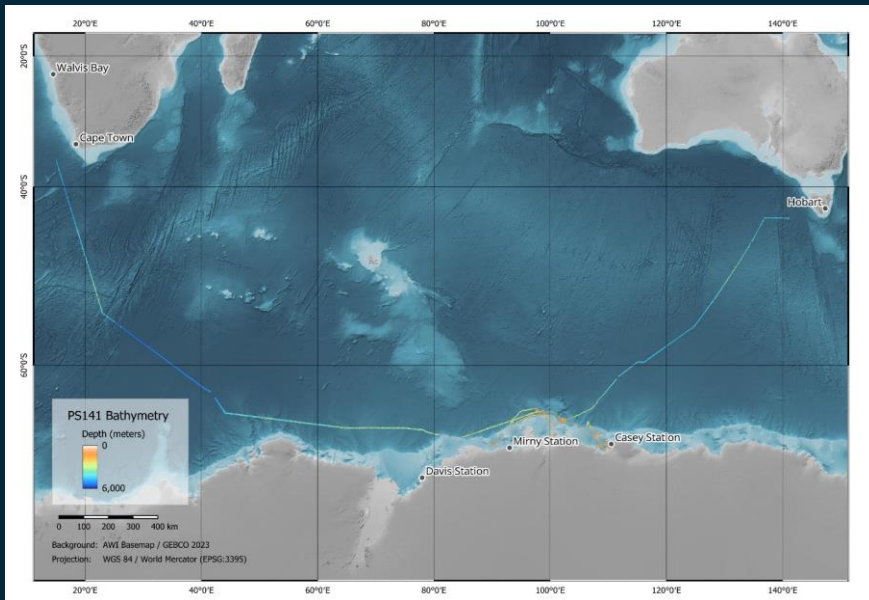




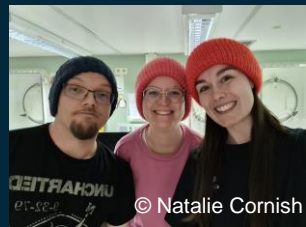
**PS134**  
**(WAIS\_BELL):**  
2022-12-23 (Cape  
Town) –  
2023-03-06 (Punta  
Arenas)



**PS140 (EASI-2):**  
2023-11-25  
(Cape Town) –  
2024-02-01  
(Hobart)



**PS141 (EASI-3):**  
2024-02-06  
(Hobart) –  
2024-04-14  
(Walvis Bay)

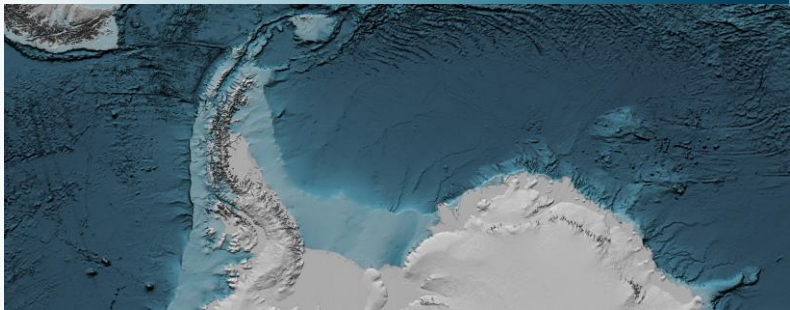


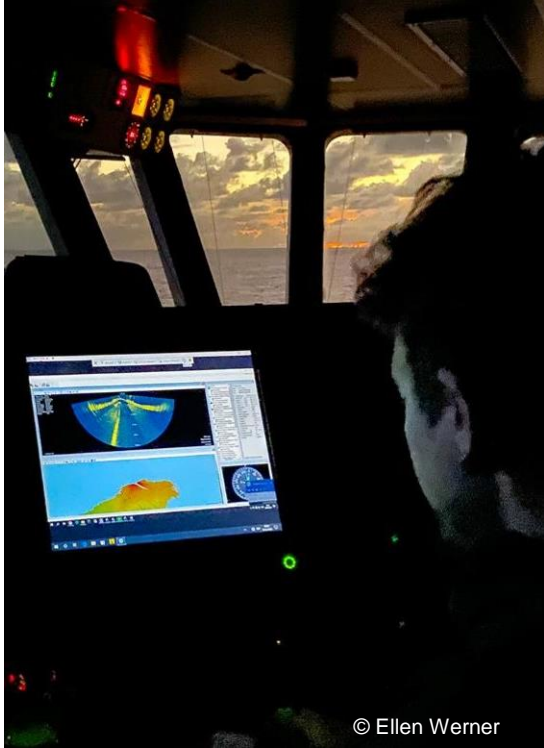
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# — Upcoming mapping activities (May 2024 to May 2026)

## Upcoming expeditions with bathymetry of RV Polarstern

- PS146 HAFOS – COSMUS-2 (2025)
- PS159 SWOS (2026)





## — Developments

- **Annual releases available in September** – in time for planning of the upcoming Antarctic season
- Variable resolution and extend
- Improved metadata management
- Multi-resolution approach for IBCSO
- Improved GEBCO deliverables

## — Further Improvements

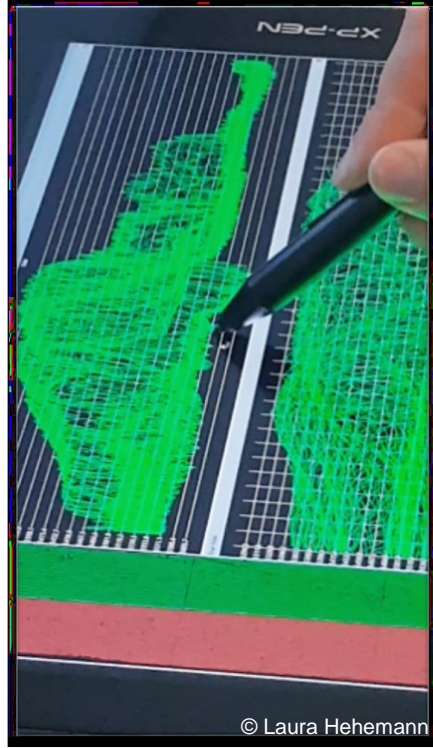
- Eliminate duplicates
- AI based artifact search
- Enhanced project management and data hunt
- Advanced preprocessing tool
- HPC Hardware Update -> 6 h for new IBCSO product (also for higher resolution like 100 m)



## — Data contributions

- To improve the next versions of IBCSO & GEBCO products
- Contributions welcome anytime
- Submit to **IHO DCDB** directly or please contact us:

**ibcso@awi.de** or  
**southern-ocean@seabed2030.org**



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Thanks for your attention

