



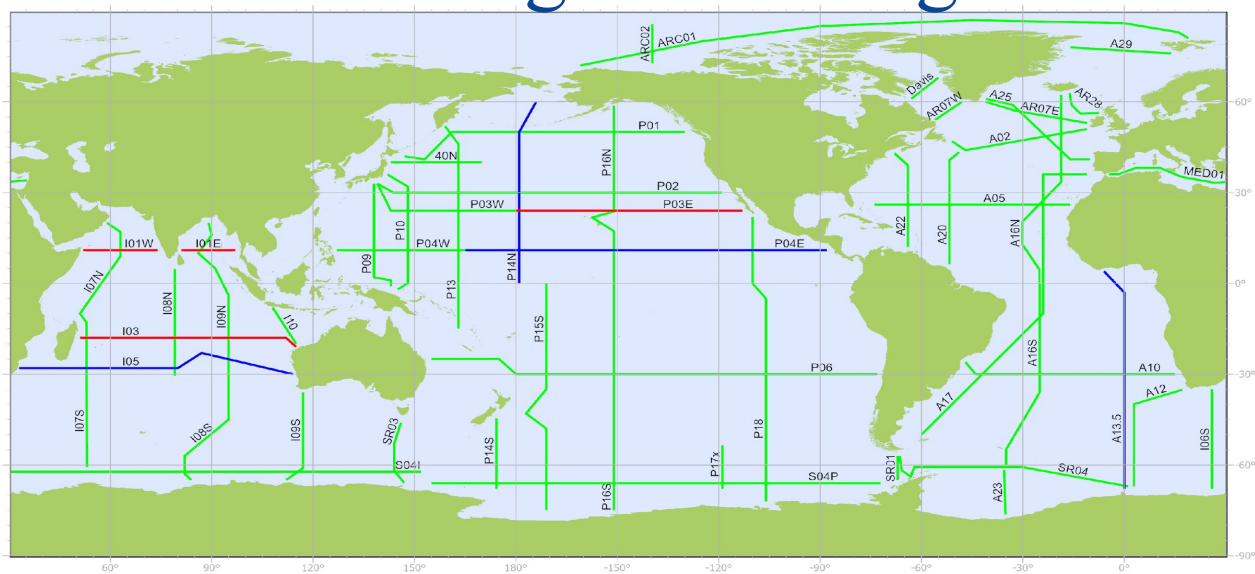
Ocean interior carbon and GLODAP

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Atlantic Oceanographic and Meteorological Laboratory, NOAA

And many collaborators: Rik Wanninkhof, Richard Feely, Brendan Carter, Denis
Pierrot, Simone Alin...

GO-SHIP: Global Ocean Ship-based Hydrographic Investigations Program



GO-SHIP

Status of 2012-2023 Survey (55 Core Lines)

May 2023

- completed: 47 (86% of all core lines)
- planned or funded: 4 (7% of all core lines)
- not planned yet: 4 (7% of all core lines)

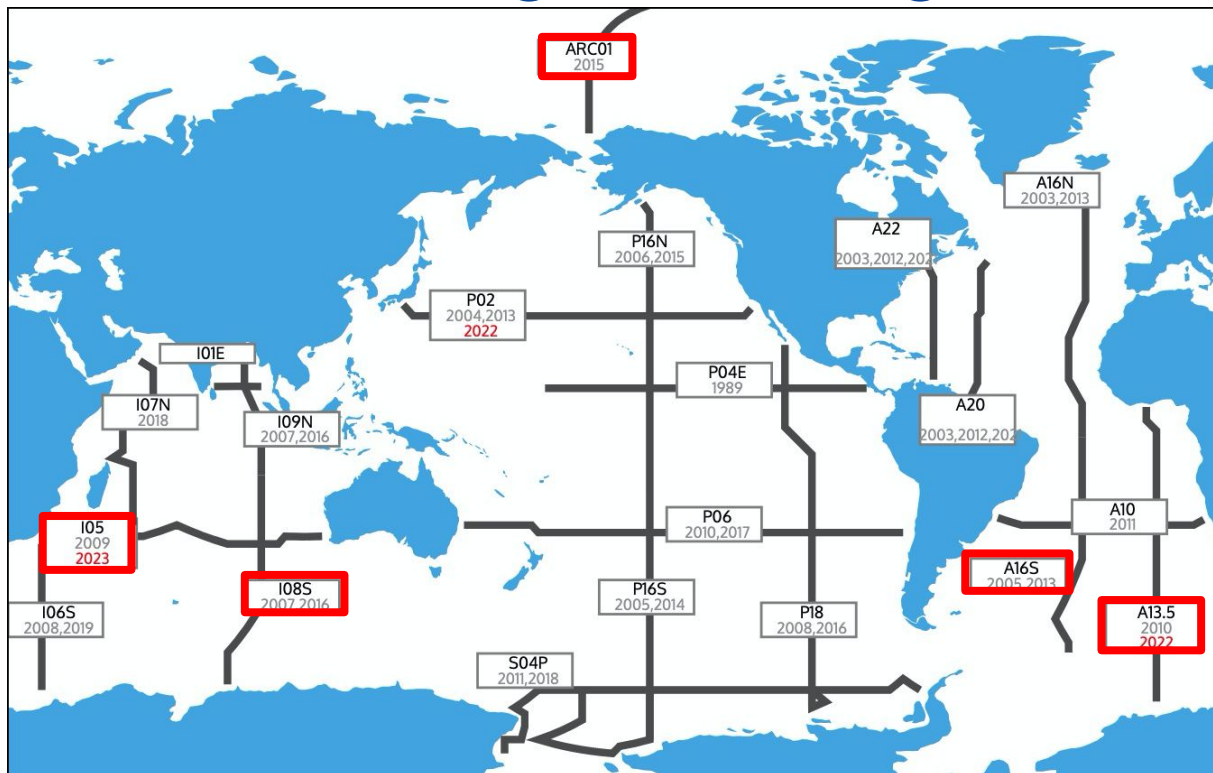
Lines completed or planned: 94% (51 core lines)
 Countries providing ship-time: 10
 Elapsed survey time: 95% (floating 11 years)



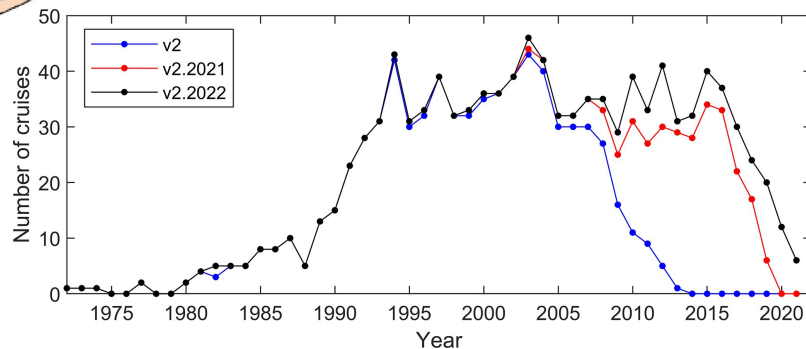
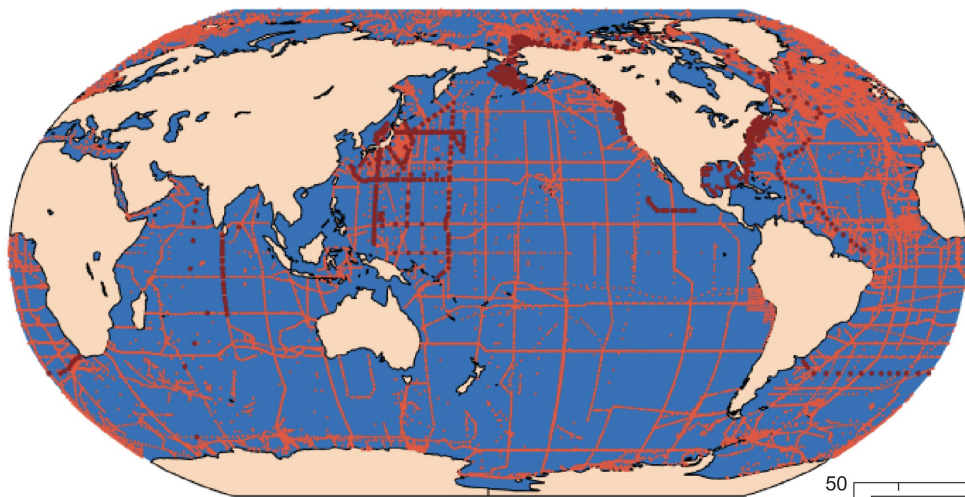
Generated by ocean-ops.org, 2023-05-03
 Projection: Plate Carree



GO-SHIP: Global Ocean Ship-based Hydrographic Investigations Program



glodap : GLobal Ocean Data Analysis Project



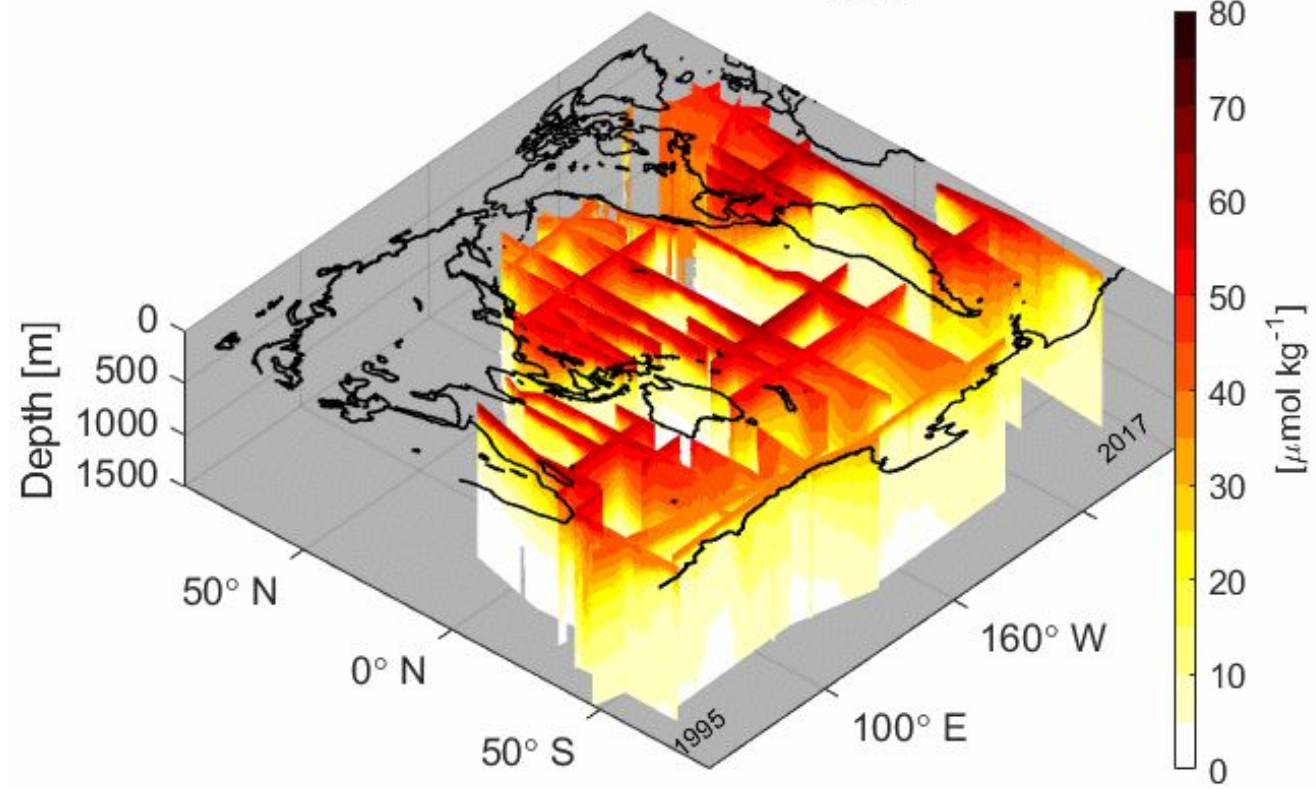


Ways interior ocean carbon is constrained

- Surface fluxes
- Ship-based interior ocean measurements (GO-SHIP)
- Global Ocean Biogeochemical Models
- Biogeochemical Argo with machine learning remapping



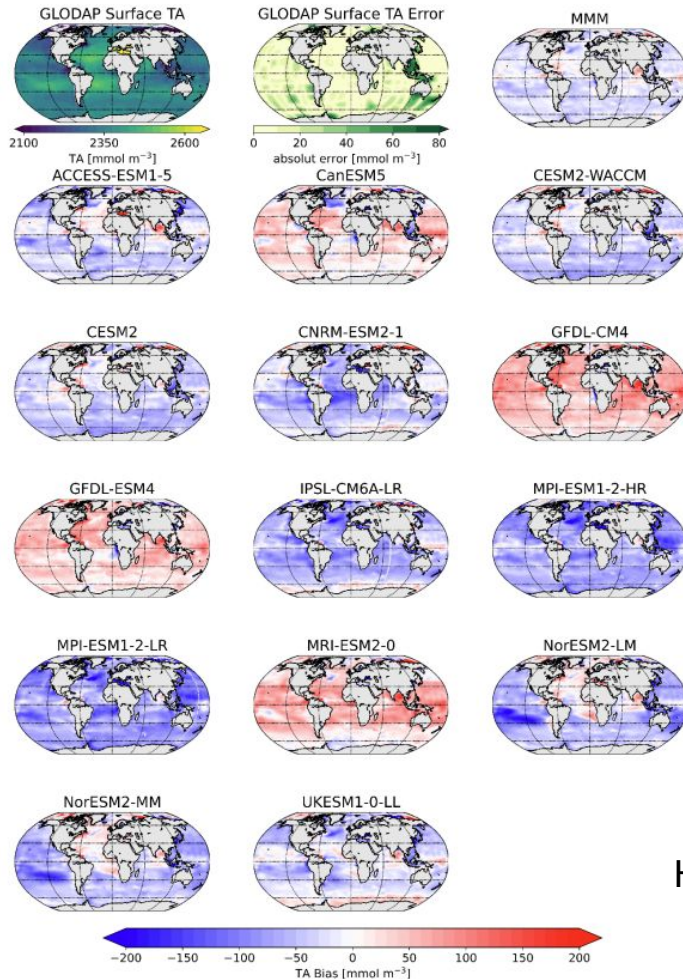
Anthropogenic carbon (C_{anth}) 1995



Carter et al. 2019



GO-SHIP for MRV



Most models underestimate alkalinity at the surface and in the upper ocean, while overestimating alkalinity in the deeper ocean

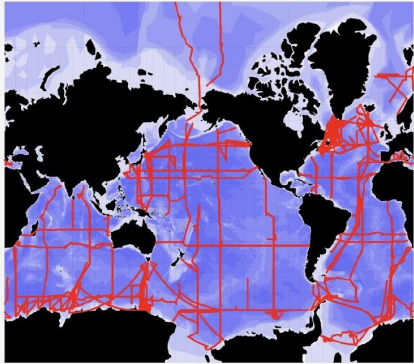
Hinrichs et al. 2023

Data Management & Access

<https://cchdo.ucsd.edu/search?q=GO-SHIP>

CCHDO Home Find Data Submit Data Information

GO-SHIP Search



Filter Table:

Bulk Download Options -

Results: 152

Search Tips:

- Click the table headings to sort the results, again to reverse the order.
- Type text in the box above to further filter the results shown in the table.
- To do a new search, use the search box at the top of the page.

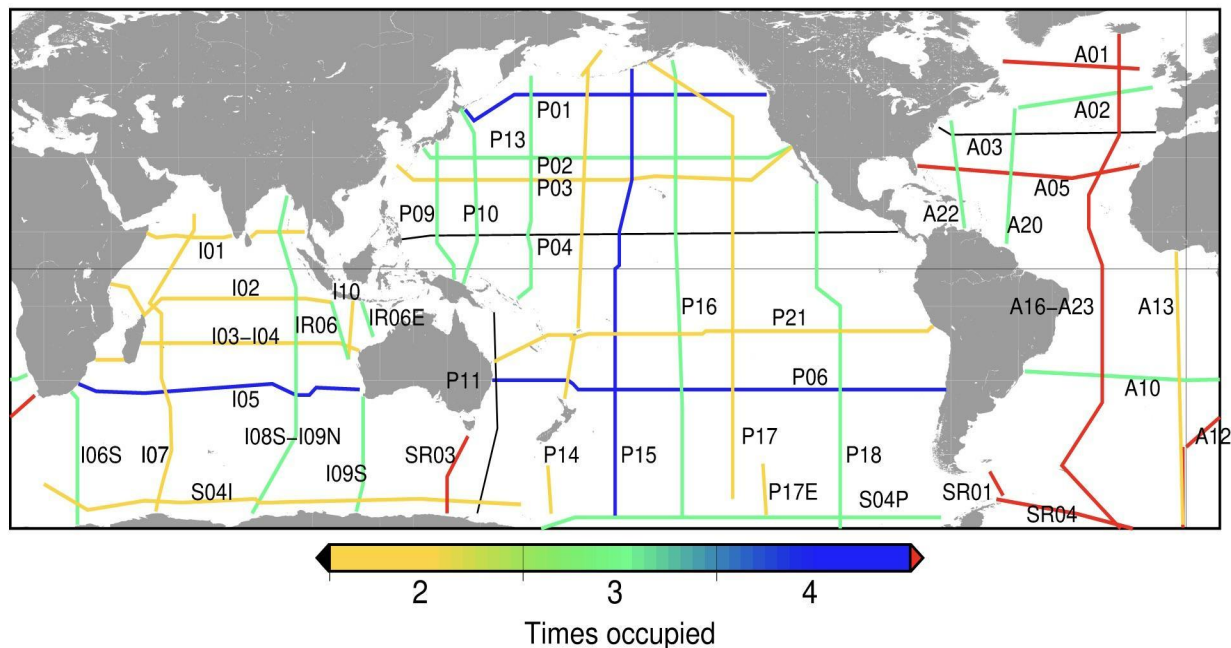
Search Results

ExPCODE	Line(s)	Ship	Country	Start Date	End Date	PI
33RO20230306	• A16N	RONALD H. BROWN	US	2023-03-06	2023-04-07	• Zachary Erickson
49UP20220727	• P09	RYOFU MARU	JP	2022-07-27	2022-11-02	• NAGAI Naoki
33RR20220613	• P02 • P02E	ROGER REVELLE	US	2022-06-13	2022-07-16	• Andreas Thurnherr
33RR20220430	• P02 • P02W	ROGER REVELLE	US	2022-04-30	2022-06-10	• Alison Macdonald
49UP20210719	• P03W	RYOFU MARU	JP	2021-07-19	2021-10-14	• NAGAI Naoki
49NZ20210713	• P01	RV MIRAI	JP	2021-07-13	2021-08-26	• Shinya Kouketsu
325020210420	• A22	RV Thomas G. Thompson	US	2021-04-20	2021-05-16	• Viviane Menezes
325020210316	• A20	RV Thomas G. Thompson	US	2021-03-16	2021-04-16	• Ryan Woosley
33RO20200321	• A12	RONALD H. BROWN	US	2020-03-21	2020-04-17	• Leticia Barbero
74EQ20200203	• A23 • SR1B	Discovery	GB	2020-02-03	2020-03-13	• Yvonne Firing
740H20200119	• A05	RRS JAMES COOK	GB	2020-01-19	2020-03-01	• A Sanchez-Franks
49NZ20191229	• I07 • I07C	MIRAI	JP	2019-12-29	2020-02-10	• Katsuro Katsumata



What is new?

<https://cchdo.ucsd.edu/products/goship-easyocean>



GO-SHIP Easy
Ocean: Formatted
and gridded
ship-based
hydrographic section
data
<https://doi.org/10.7942/GOSHIP-EasyOcean>

Katsumata *et al.* (2022). <https://doi.org/10.1038/s41597-022-01212-w>

Department of Commerce | National Oceanic and Atmospheric Administration



Implications and societal benefit of research



600+ publications

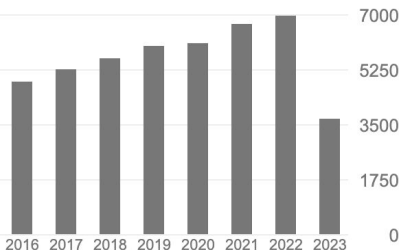
glodap

Cited by

[VIEW ALL](#)

	All	Since 2018
Citations	73924	35110
h-index	121	88
i10-index	524	421

2000+ publications
40 just this year



Engaging with the broader community

Example: A16N

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Research Science and Technology

Testing the ocean's chemistry a climate impact

A team of researchers from the Rosenstiel
Cooperative Institute for Marine and Atmospheric

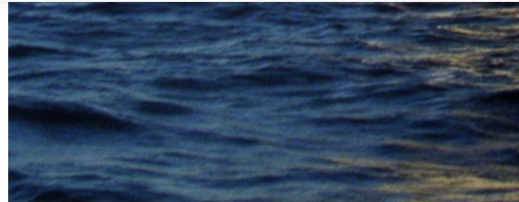
miamirosenstiel Repost
GO-SHIP A16N research
researchers from the Ro
@cimas_rosenstiel @no
research institutions (4E

NOAA Atlantic Oceanographic
Meteorological Laboratory
National Oceanic and Atmospheric Administration

noaa_aoml The Global
Investigations Program
the NOAA Ship Ronald H
destination in Reykjavik
which starting in Brazil!



About Us The Ocean



FIRST NOAA GO-SHIP CRUISE IN 5 YEARS DEPARTS TO S ATLANTIC BASIN

News / By Sarah Tucker / March 7, 2023

On June 8, 2023 by AOML Communications to Ocean Chemistry and Ecosystems, Oceans Influx & Weather

Fifty-Five Days at Sea: Collecting Oceanographic Data from Brazil to Iceland



noaaresearch In May, a team of scientists
NOAA Ship Ronald H. Brown arrived at their first
Reykjavik, Iceland following 55 days at sea on
cruise.

The team of 50 scientists and 28 crew members
track through the North Atlantic, from Brazil to
successfully completed 150 stations, collecting
samples from the Atlantic's surface to the seafloor.
scientists a holistic snapshot of the Atlantic Ocean



US Embassy Reykjavik Iceland
24 de mayo

U.S. Research Vessel Ronald H. Brown in Reykjavik



Challenges

GO-SHIP

- Packed schedule of cruises in the next 1-2 years
- DAS limitations restrict to some extent new programs
- Individual cruise data management falls on chief-sci

GLODAP

- Insufficient funding for sustained effort globally.



Takeaways

- There are 3-4 approaches for quantifying ocean carbon distributions
- Interior ocean carbon science **relies on GO-SHIP**
 - GO-SHIP provides ~**decadal, surface-to-bottom, reference quality** anthropogenic carbon on repeat lines
- **US GO-SHIP** needs **continued** and **expanded support**