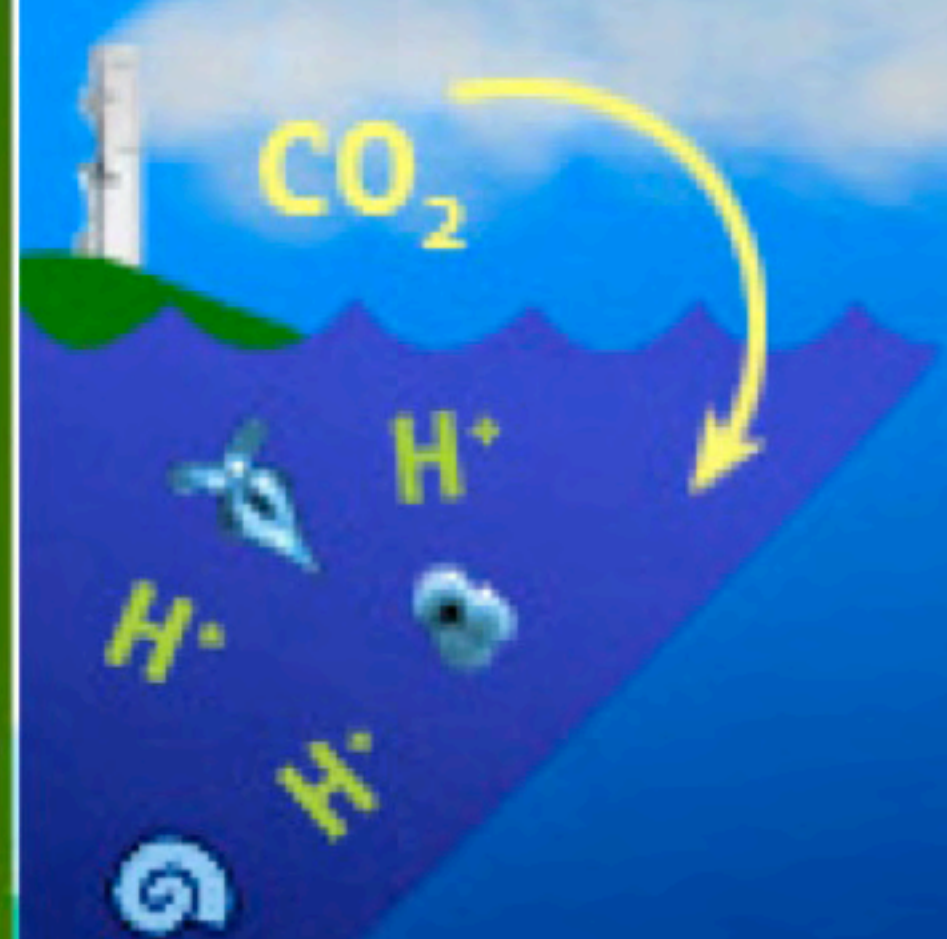


Data Management for Ocean Acidification Projects

Cyndy Chandler

Biological and Chemical Oceanography Data Management Office

24 March 2011
Ocean Acidification PI Meeting
Woods Hole, MA USA

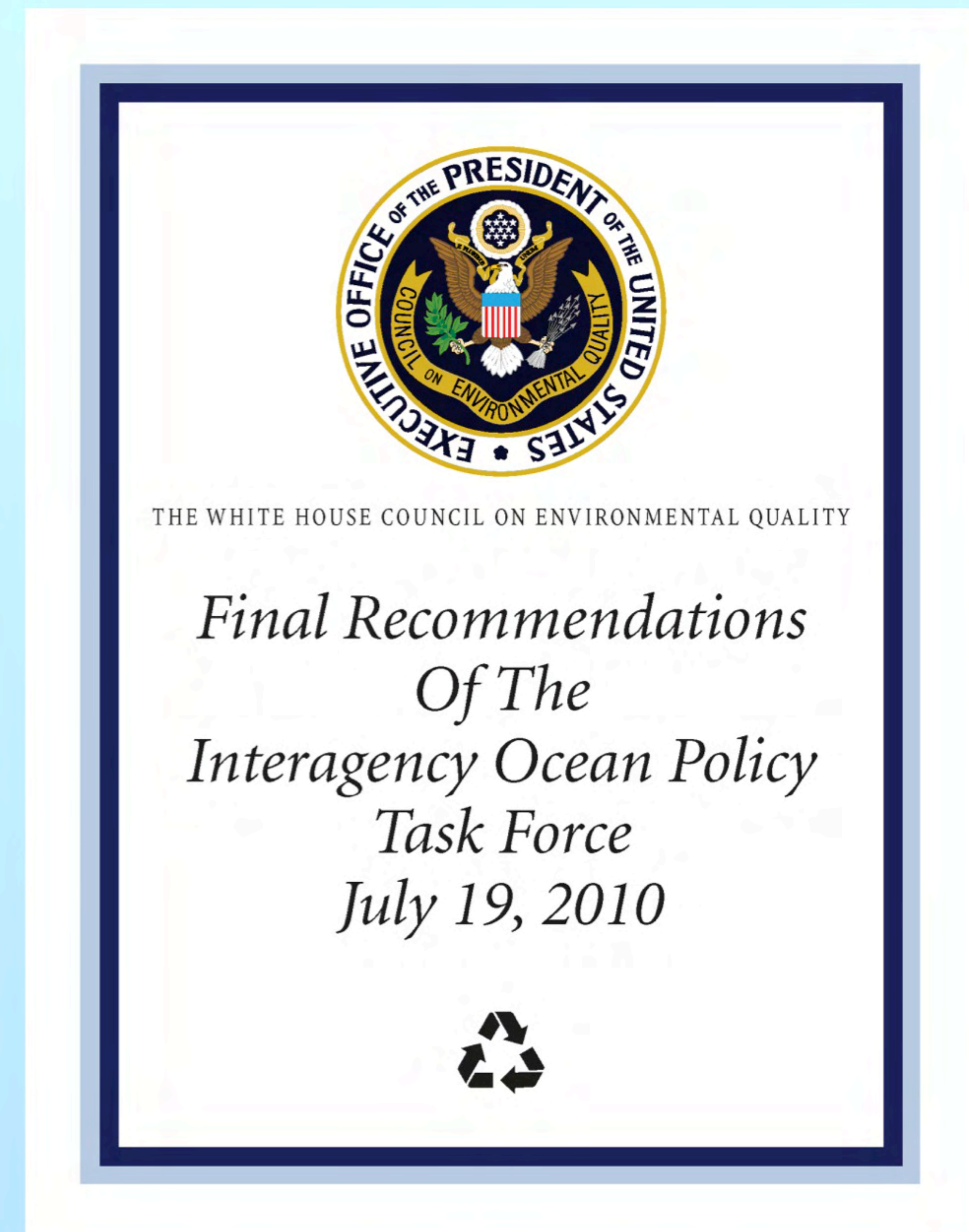


Ocean Acidification

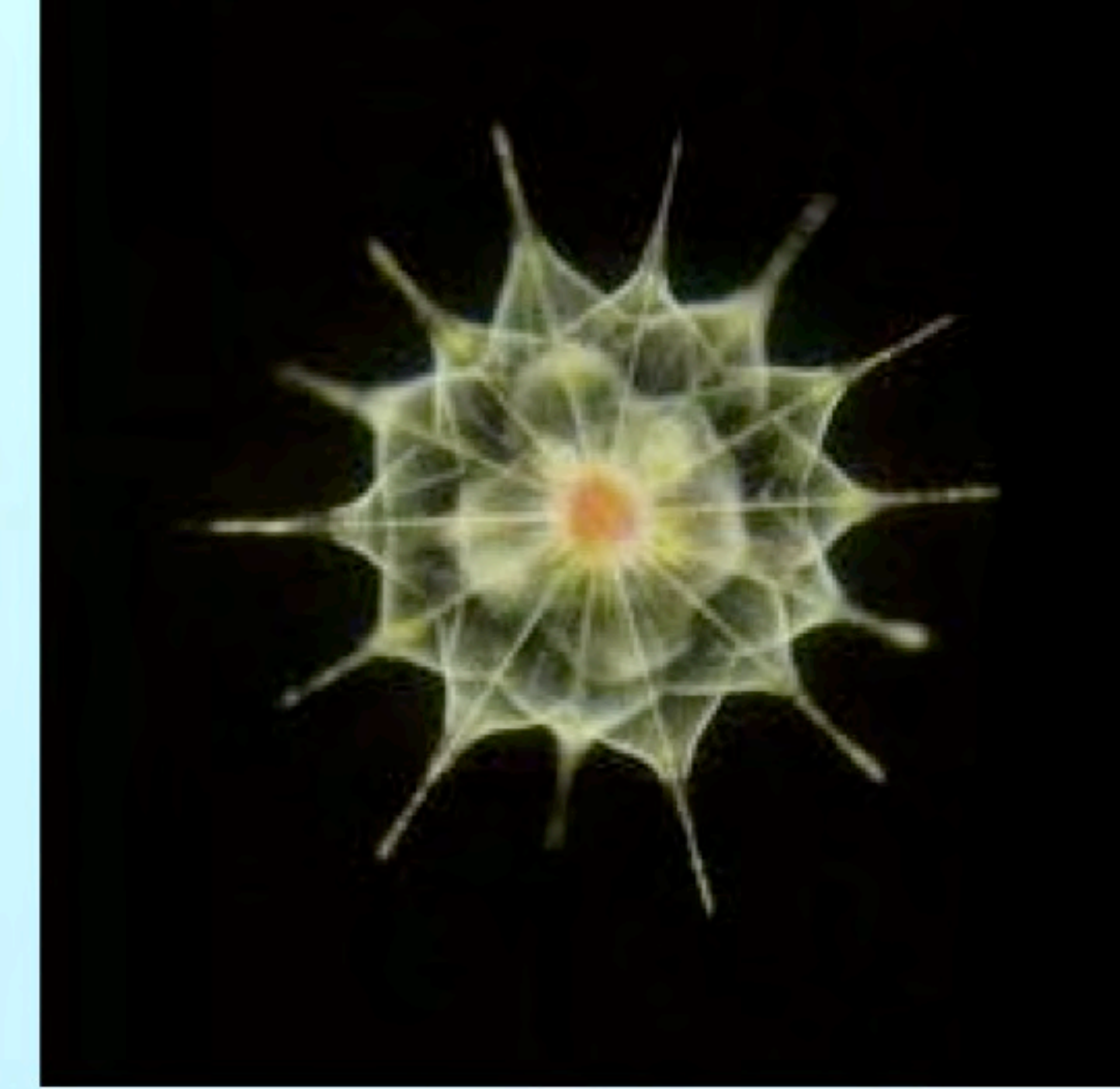
*Studying ocean acidification's effects
on marine ecosystems and biogeochemistry*

Discussion Topics

- New funding agency requirements
- New expectations for data access
- Resources for OA data management



New funding agency requirements and expectations ~ NSF



- Division of Ocean Sciences Data and Sample Policy. National Science Foundation. *NSF 04-004*
<http://www.nsf.gov/pubs/2004/nsf04004/nsf04004.pdf>

General Data Policy

Principal Investigators are required to submit all environmental data collected to the designated National Data Centers as soon as possible, but no later than two (2) years after the data are collected. Inventories (metadata) of all marine environmental data collected should be submitted to the designated National Data Centers within sixty (60) days after the observational period/cruise.

New funding agency requirements ~ NSF

■ **Proposal Requirements – The Two Page Plan**

The NSF Grant Proposal Guide requires that proposal Project Descriptions outline plans for preservation, documentation, and sharing of data, samples, physical collections, curriculum materials and other related research and education products. Plans for the handling of data and other products will be considered in the review process.

■ **Reporting Requirements**

Annual reports, required for all projects, should address progress on data and research product sharing. The Division of Ocean Sciences requires that final reports document compliance or explain why it did not occur.

New expectations for data access

- complex research themes (ocean biogeochemistry, ocean acidification research) require access to data collected by other researchers
- access to results from research designed to enable science-based decision support for legislative policies
 - social science
 - economics
 - history
 - broad range of disciplines



these data . . .

	A	B	C	D	E	F	
1	Sample	PO4	SiO2	NO3	NO2	(mM)	
2	DIL 1	1.39	1.7	21.4	0.24	nd	
3	DIL 2	1.43	2.6	22.2	0.28	nd	
4	DIL 3	1.92	64.3	26.5	0.21	nd	
5	DIL 4	1.91	64.8	26.1	0.19	nd	
6	DIL 5	1.89	64.2	26.0	0.15	nd	
7	DIL 6	1.93	64.4	26.6	0.20	nd	
8	DIL 7	1.87	61.1	26.9	0.20	nd	
9	DIL 8	1.86	63.1	26.1	0.12	nd	
10	DIL 9	1.93	64.7	26.4	0.12	nd	
11	DIL 10	1.85	62.9	25.5	0.14	nd	
12	DIL 11	1.87	61.8	25.7	0.15	nd	
13	DIL 12	1.73	62.7	24.6	0.23	nd	
14	DIL 13	1.77	61.0	25.8	0.12	nd	
15	DIL 14	1.91	64.8	26.7	0.10	nd	
16	DIL 15	1.60	60.8	26.2	0.11	nd	
17	DIL 16	1.43	2.6	22.2	0.21	nd	
18	DIL 17	1.41	2.3	22.2	0.16	nd	
19							

. . . are incomplete and of little use to colleagues

The data set lacks sufficient metadata to enable efficient and accurate reuse.

Presumably the data originator would decode Sample 'DIL 10' because they know it to be a proxy for where, when and how the data were collected.

Resources for OA Data Management

■ People, Web Sites, Data Repositories

- BCO-DMO
- CDIAC
- OBIS-USA
- GenBank

■ Manuals and Guides

- BCO-DMO
- EPOCA
- GO-SHIP manual
- ICES manuals

OCB and EPOCA sponsored OA Short Course

- **Ocean Acidification Short Course**
- November 2-13, 2009 (Woods Hole, MA)
- <http://www.whoi.edu/courses/OCB-OA/>
follow links to course materials



BCO-DMO

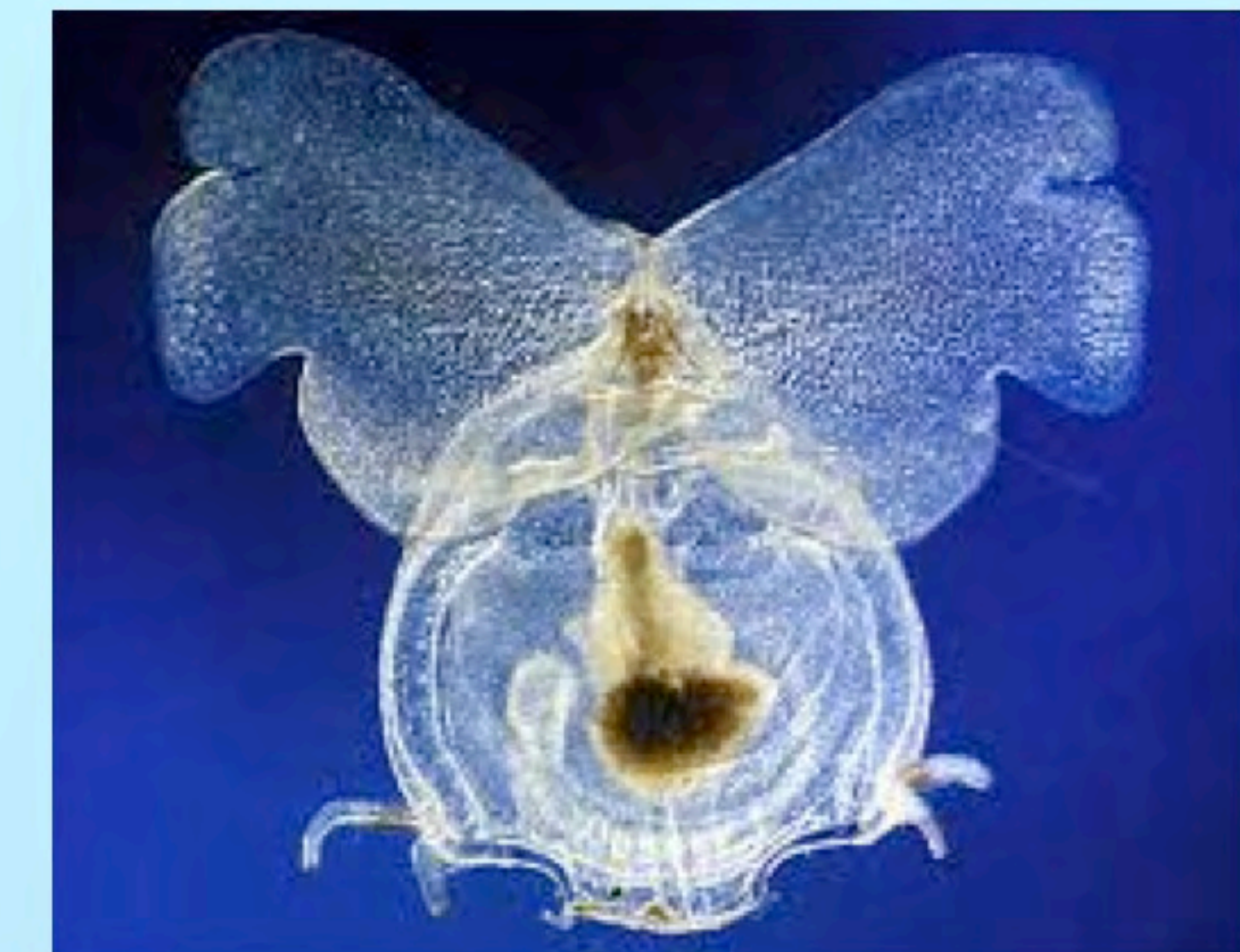
Biological and Chemical Oceanography Data Management Office

<http://bco-dmo.org>

- NSF research funded by program managers:
 - Dave Garrison (OCE Biology)
 - Don Rice (OCE Chemistry)
 - Roberta Marinelli (OPP ANT Organisms & Ecosystems)

- see the BCO-DMO Resources page for information on the NSF “2 page plan” or contributing data
 - <http://www.bco-dmo.org/resources>

- Data Management Best Practice Guidelines Manual
 - http://bcodmo.org/files/bcodmo/BCO-DMO_Guidelines.pdf



BCO-DMO

Biological and Chemical Oceanography Data Management Office

<http://bco-dmo.org>

- data management for investigators funded by NSF OCE Biological and Chemical Oceanography Sections or NSF OPP ANT Organisms & Ecosystems Program
 - partner with individual investigators and those associated with collaborative research projects (e.g. CRI-OA)
 - data management support throughout the project
 - capture and record documentation (metadata) sufficient to support data reuse
 - load data and metadata into a relational database and ensure their availability online
 - ensure final archive in appropriate data center (e.g. NODC); links to special repositories (e.g. CDIAC, OBIS-USA, GenBank)

BCO-DMO

Biological and Chemical Oceanography Data Management Office

<http://bco-dmo.org>

- data in ... data out @ <http://bcodmo.org/data>
- BCO-DMO is a source for data from these projects:

US JGOFS

US GLOBEC

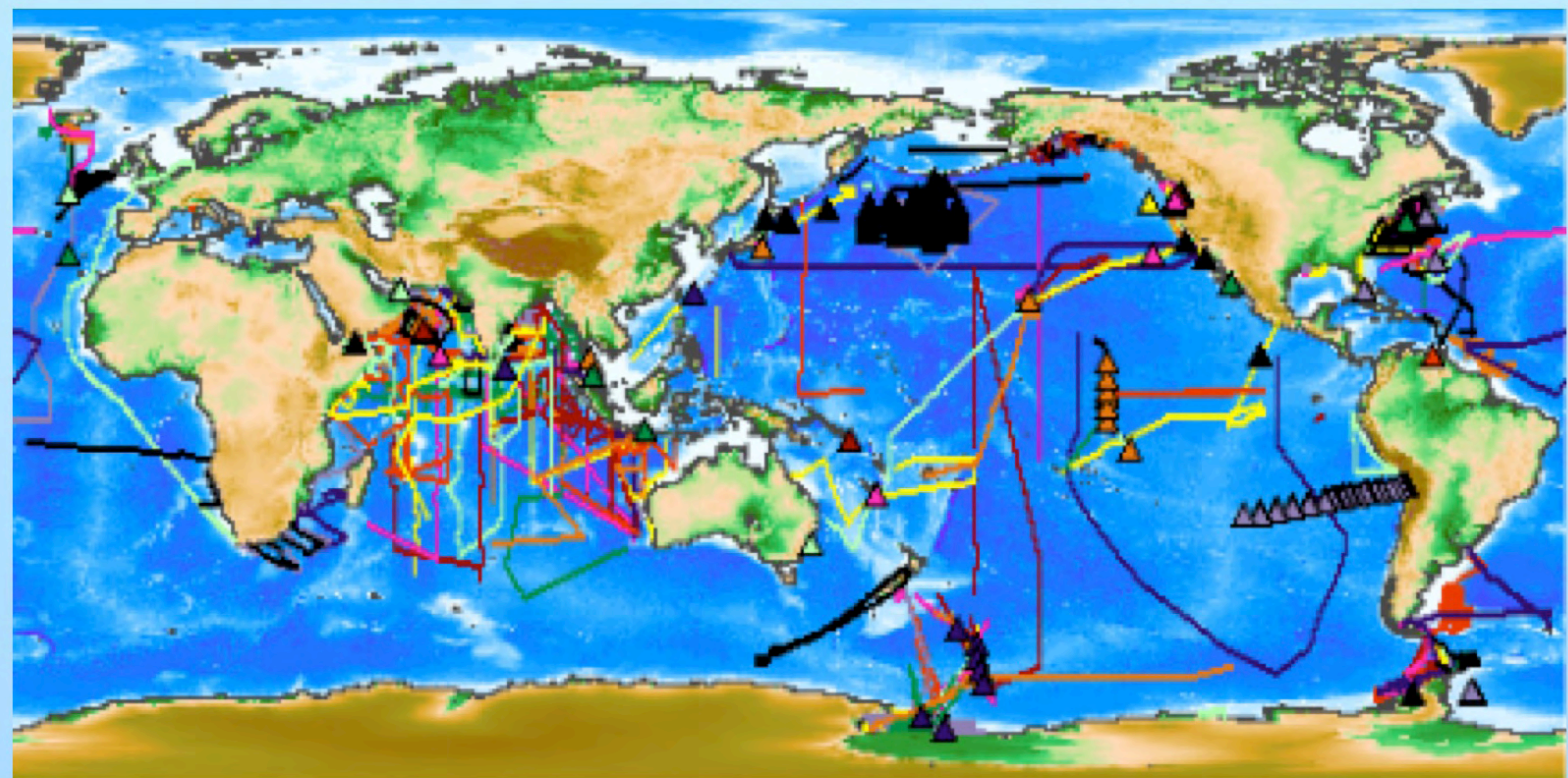
US GEOTRACES

US SOLAS

IMBER-US

CoML (CMarZ and IIOE)

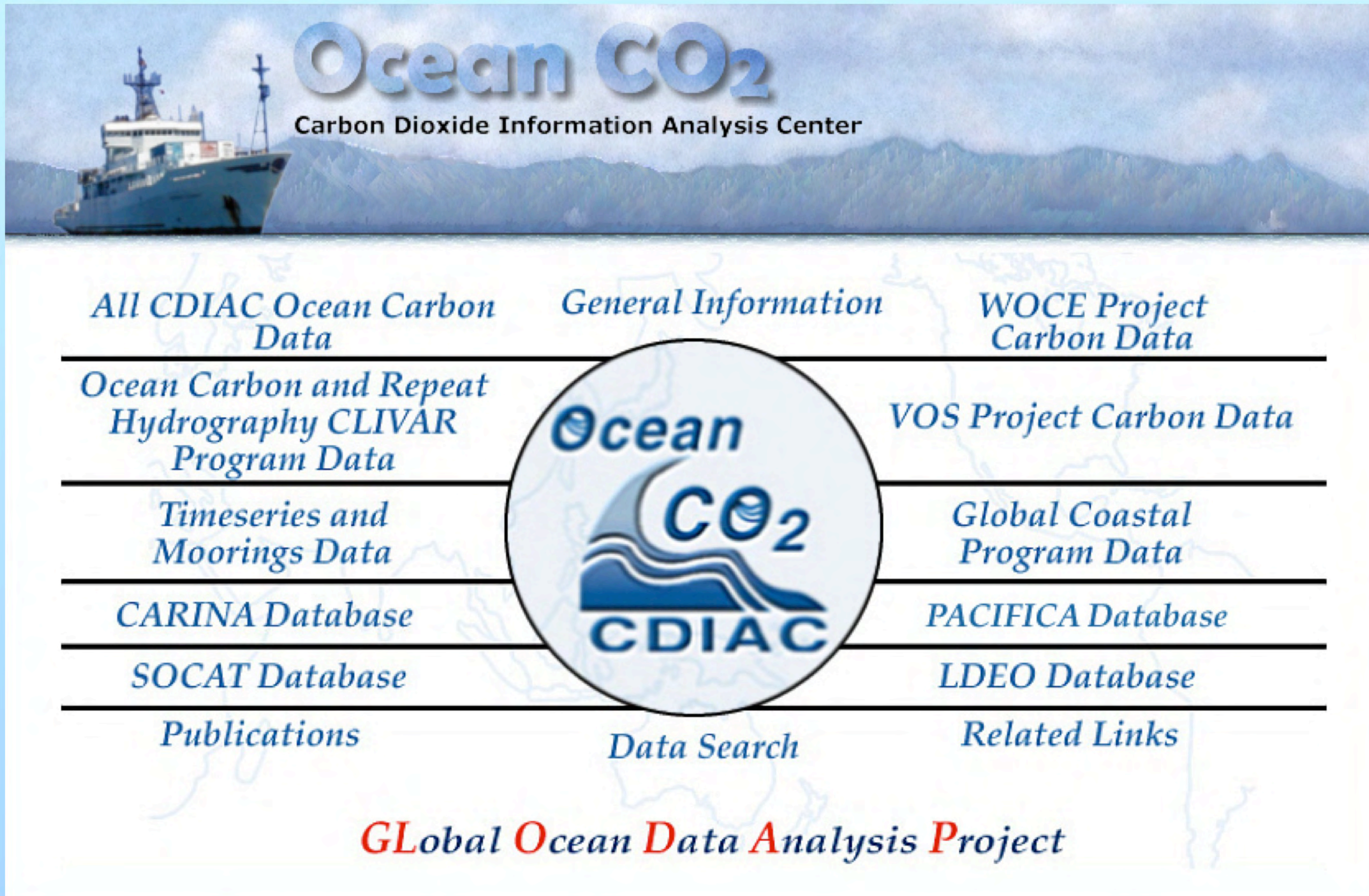
CAMEO



CDIAC

Carbon Dioxide Information Analysis Center-Ocean CO₂

<http://cdiac.ornl.gov/oceans/>



The banner features a background image of a research ship on the left and a mountain range on the right. The text 'Ocean CO₂' is prominently displayed in a large, blue, 3D-style font. Below it, 'Carbon Dioxide Information Analysis Center' is written in a smaller, black font. A central circular logo contains the text 'Ocean CO₂ CDIAC' with a stylized wave and CO₂ molecule. The logo is surrounded by a grid of menu items: 'All CDIAC Ocean Carbon Data', 'General Information', 'WOCE Project Carbon Data', 'Ocean Carbon and Repeat Hydrography CLIVAR Program Data', 'VOS Project Carbon Data', 'Timeseries and Moorings Data', 'Global Coastal Program Data', 'CARINA Database', 'PACIFICA Database', 'SOCAT Database', 'LDEO Database', 'Publications', 'Data Search', and 'Related Links'. At the bottom, the text 'Global Ocean Data Analysis Project' is written in a red and black font.

TCO₂ (DIC)

TALK

pH

pCO₂

CFCs

SF₆

CC₁₄

CaCO₃

DOC, TOC

TDN

dC₁₄

OBIS - USA

Ocean Biodiversity Information System (OBIS) - USA

<http://obisusa.nbii.gov> (will redirect)

The screenshot shows the OBIS-USA website interface. At the top, there is a navigation bar with the NBII logo and text 'National Biological Information Infrastructure'. To the right, there are links for 'Geospatial | Advanced | Help' and a search box labeled 'raptor' with a 'search' button. Below this is a main navigation menu with links: 'NBII Home', 'About NBII', 'Plants, Animals & Other Organisms', 'Habitats', 'Ecological Topics', 'Geographic Perspectives', and 'Toolkit'. The main header area features a banner image of marine life and the text 'Ocean Biodiversity Information System (OBIS) - USA'. Below the banner is a breadcrumb trail: 'NBII Home > Habitats > Marine > Marine Data (OBIS-USA) > Marine Data (OBIS-USA)'. On the left side, there is a vertical menu with the following items: 'Marine', 'Marine Data (OBIS-USA)', 'Atlas', 'Beta Test - Geographic Search', 'Contributing Data', 'Data Dashboard', 'Data Richness', 'Date Quality', 'Duplication Status', 'General Metadata', 'Geographic Coverage', 'Participants', 'Policies and Disclaimer', and 'Taxonomic Depth'. The main content area is titled 'Welcome to OBIS-USA' and contains the following text: 'OBIS-USA is a one-stop source for biogeographic data collected from U.S. waters and oceanic regions--the Arctic, the Atlantic and Pacific oceans, the Caribbean Sea, the Gulf of Mexico, and the Great Lakes. It provides access to highly distributed data sets from a multitude of partners documenting where and when species were observed or collected. The site allows one to examine each data set to assess its applicability for a variety of uses. Current functionality allows the user to view the data and FGDC compliant metadata as well as to view geographic, temporal or spatial extent; the taxonomic depth and richness. Data are accepted into OBIS-USA from the original developer or curator of the data. If you would like to contribute data please see: [Contributing Data](#). OBIS-USA is the U.S. regional node of the global [Ocean Biogeographic Information System \(OBIS\)](#). [OBIS-USA Fact Sheet](#).' Below this is a section titled 'Partnerships and Affiliations' with three sub-sections: 'U.S. National Committee for the Census of Marine Life' (described as an advisory body), 'Ocean Biogeographic Information System (OBIS)' (described as a program under UNESCO's IOC), and 'OBIS-USA Data Providers' (described as organizations and persons serving data through the portal). On the right side, there is a 'OBIS-USA Summary Statistics' table and a 'Contact Us' form. The table shows: Total Records (6,596,340), Total Unique Taxa (83,226), Participants (36), and Datasets (145). The contact form includes fields for email address, name, and a text area for questions or comments, with a 'Send Comments' button.

OBIS-USA Summary Statistics	
Total Records	6,596,340
Total Unique Taxa	83,226
Participants	36
Datasets	145

SEARCH for DATA

SUBMIT DATA



- European Project on Ocean Acidification (EPOCA)
- "Guide for Best Practices on Ocean Acidification Research and Data Reporting"

available on the EPOCA web site:

<http://www.epoca-project.eu/index.php/Home/Guide-to-OA-Research/>

Editors in chief:

Ulf Riebesell, Victoria J. Fabry, Jean-Pierre Gattuso



THE GLOBAL OCEAN SHIP-BASED HYDROGRAPHIC INVESTIGATIONS PROGRAM

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DATA DIRECTORY

HYDRO MANUAL

DOCUMENTS

NEWS

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QUICK LINKS



GO-SHIP

TOWARDS A SUSTAINED GLOBAL SURVEY OF THE OCEAN INTERIOR

GO-SHIP brings together scientists with interests in physical oceanography, the carbon cycle, marine biogeochemistry and ecosystems, and other users and collectors of hydrographic data to develop a globally coordinated network of sustained hydrographic sections as part of the global ocean / climate observing system.

GO-SHIP is sponsored by the International Ocean Carbon Coordination Project (IOCCP) and the Climate Variability and Predictability Program (CLIVAR), in collaboration with IMBER, SOLAS, Argo, and OceanSITES.



Jump to:
GO-SHIP Reference
Sections [MAP](#)

Jump to:
GO-SHIP Reference
Sections [TABLE](#)

BULLETIN BOARD

- 26 Nov** The GO-SHIP Panel has finalized the GO-SHIP Development Plan, which outlines priorities and timelines for coordinating national hydrography programs into a global coordinated network, and the organizational framework and budget required to develop a sustained program. The Plan will be published by early 2011.
- With the completion of the Development Plan, Maria Hood will be stepping down as GO-SHIP Project Coordinator for a sabbatical. IOCCP Project Coordinator Kathy Tedesco will serve as GO-SHIP coordinator until a Program Office can be established.

ICES

International Council for the Exploration of the Sea

<http://www.ices.dk/indexfla.asp>



International Council for the Exploration of the Sea - Conseil International pour l'Exploration de la Mer

ICES CIEM

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ICES Bulletin Board

ICES Science & Advice

- ▶ The on-line registration for the 2011 [Annual Science Conference](#) is now open. Click [here](#) to register.
- ▶ ICES/NAFO Symposium on the *Variability of the North Atlantic and its Marine Ecosystems during 2000-2009*, 10-12 May 2011 in Santander, Spain. Click [here](#) to read more.
- ▶ ICES Training Programme: stay updated on the coming courses [here](#).
- ▶ Learn more about The Marine Strategy Framework Directive [here](#).

Hot articles and publications

NEW - CRR 306 Life-cycle spatial patterns of small pelagic

ICES Data Portal

IODE Recommended Read:

ICES Zooplankton
Methodology Manual



ICES CIEM

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Miscellaneous

Climate Change brochure

This brochure provides a state-of-the-art overview of ICES studies on climate change and variability

ICES Code of Practice on the Introductions and Transfers of Marine Organisms 2005

The ICES Code of Practice gives recommended procedures and practices to reduce the risks of detrimental effects from the intentional introduction and transfer of marine (including brackish water) organisms.

The Code is aimed at a broad audience since it applies to both public (commercial and governmental) and private (including scientific) interests. In short, any persons engaged in activities that could lead to the intentional or accidental release of exotic species should be aware of the procedures covered by the Code of Practice.

ICES Zooplankton Methodology Manual

The [ICES Zooplankton Methodology Manual](#) was produced by the ICES Working Group on Zooplankton Ecology (WGZE) with the objective of providing an updated review of basic methodology used in studies of zooplankton. This exercise resulted in a >600 pp book published by Academic press.

Publications

- [Intro](#)
- [Pub. Committee](#)
- [ICES Journal](#)
- [ICES Advice](#)
- [Coop. Res. Reports](#)
- [TIMES](#)
- [ID Leaflets](#)
- [Fish Statistics](#)
- [Symposium Reports](#)
- [Annual Report](#)
- [CD-ROMs](#)
- [CM Documents](#)
- [Misc. Publications](#)
- [ICES Insight](#)
- [ICES Inside Out](#)
- [ICES Merchandise](#)
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Hot articles

NEW - CRR 306 Life-cycle spatial patterns of small pelagic fish in the Northeast Atlantic. 2010. [View CRR 306](#)

CRR 305 Cod and future climate change. 2010. [View](#)

<http://www.ices.dk/products/misc.asp>

“ You can’t play with the data without the metadata.

Well, you can, but it’s much less fun. “ Peter Wiebe
(WHOI, 2009)



Thank you.
Questions?

Chris Linder (WHOI)