

Introduction

Searching for and locating data of interest can be a challenge to researchers as increasing volumes of data are made available online through various data centers, repositories, and archives. The Biological and Chemical Oceanography Data Management Office (BCO-DMO)¹ is keenly aware of this challenge and, as a result, has implemented features and technologies aimed at improving data discovery and enhancing the user experience.

The BCO-DMO text-based and geospatial-based data access systems provide users with tools to search, filter, and visualize data in order to efficiently find data of interest. The geospatial interface, developed using a suite of open-source software (including MapServer, OpenLayers, ExtJS, and MySQL), allows users to search and filter/subset metadata based on program, project, or deployment, or by using a simple word search. The map responds based on user selections, presents options that allow the user to choose specific data parameters (e.g., a species name or an individual drifter ID), and presents further options for visualizing those data on the map or in "quick-view" plots.

The data managed and made available by BCO-DMO are very heterogeneous in nature, from *in situ* biogeochemical, ecological, and physical data, to controlled laboratory experiments. Due to the heterogeneity of the data types, a "one size fits all" approach to visualization cannot be applied. Datasets are visualized in a way that will best allow users to assess fitness for purpose. An advanced geospatial interface that contains a semantically-enabled faceted search is also available. These search facets are highly interactive and responsive, allowing users to construct their own custom searches by applying multiple filters.

New filtering and visualization tools are continually being added to the BCO-DMO system as new data types are encountered and as we receive feedback from our data contributors and users. As our system becomes more complex, teaching users about the many interactive features becomes increasingly important. Tutorials and videos are made available online. Recent in-person classroom-style tutorials have proven useful for both demonstrating our system to users and for obtaining feedback to further improve the user experience.

¹BCO-DMO was created in 2006 to manage and publish data from research projects funded by the Division of Ocean Sciences (OCE) Biological and Chemical Oceanography Sections and the Division of Polar Programs (PLR) Antarctic Sciences Organisms and Ecosystems Program (ANT) of the US National Science Foundation (NSF).

For end users, the goal is to obtain data of interest.

The Process

1 Discover data (search, filter)

2 Assess fitness for purpose (via metadata and geospatial visualization)

3 Download data

As data managers, our goal is to make the process as easy as possible.



Improving the User Experience of Finding and Visualizing Oceanographic Data

BCC	O-DMO text-based system								ſ	BCO-DMO geospatial				
		a Management Offi	lice		IOME	DATA RESOURCES ABOUT U	s			C Zoom in	1 Query 🔀 Clear query 😔 Clear h	ighlights		
ABASE	26	Projects	S								Devine.	3 Co		
Projects	270	Search Contains any v	word 👻	Search						1 Constant	12.2	a	ST S	
Deployments	1766	CoFeMUG Searched for '	'Contains any word'	CoFeMUG						15-			y fr	
nstruments	329	Project				Acconum Start Date End Do	te				HORTH		EUROPE	
Parameters	1286	Project Acronym Start Date End Date Cobalt, Iron and Micro-organisms from the Upwelling zone to the Gyre CoFeMUG 2005-03 2008-03										OR H LANTIC	and and	
People	1384			-0-						alante - Alan		V AT	AFRICA	
Attiliations Funding	353 DATABASE	ABASE											× ,	
Awards	Programs	26 Instruments										17-		
	Projects	270	Contains all word	ds 🔹	 Items per page 100 ▼ Search Reset 							fe 1	Jus	
	Datasets	.5 1700 trace metal 6594 Searched for 'Contains all words': trace metal									PANIFIC E	SOUTH ATLANTE OCEAN		
	Instruments	329	Instrument	Acronym	Description						OCDAN THE	3		
	Parameters	1286	GO-FLO Teflon	GO-FLO	GO-FLO Teflon-lined	Trace Metal free sampling bottles are used for collecti	ng water samples for							
	Affiliations	353	Trace Metal	Teflon TM t	race metal, nutrient o avoid sample cont	and pigment analysis. The GO-FLO sampling bottle is amination at the surface, internal spring contamination	designed specifically , loss of sample on			Couthern of	CEAN	Pro free		
	Funding	54	1	c	leck (internal seals),	and exchange of water from different depths.			L	W 135	00'W 90°00'W 45	°00'W 00°	00'E	
	Awards	643 Trace Metal Bottle TM Bottle Trace metal (TM) clean rosette bottle used for collecting trace metal clean seawater samples.												
	GEOSPATIAL	DATABASE	se Poople											
		Programs 26 I COpin Projects 270 Search Contains ar Saito			Results per page any word TOD Search Search									
	Aller y													
		Datasets	6594	Searched for 'C	contains any word':	Saito	1		-					
		Parameters	i 1286	Name A	Other Names	Affiliation	Address							
		People	1384	Dr Mak Saito		Noods Hole Oceanographic Institution (WHOI)	MS #51 266 Woods Hole Rd				BCO-DMO repository	MapServ	er Geospat	
		Affiliations	353 54				Woods Hole, MA 02543-1541 USA				BROWSE map	earch 😹 ADVANCED	search 🛛 🥏 Start	
		Awards	ATABASE	Sei-ichi Saitoh	1	Hokkaido University	Graduate School of Fisherie	ies Sciences		_	Keyword search string (optional):	dissolved iron	م	
		GEOSPATI	Programs	26	Datasets						Restrict results to current map view	v? Yes No		
		1 star	Projects	270 S	earch Contains all words	Results per page ▼ 100 ▼ Search					Minimum date (optional):		•	
		AR.	Datasets	6594 S	issolved iron earched for 'Contai	ns all words': dissolved iron					Results will a	ippear in a new window.	2	
			Instruments	329	Dataset 🔺	Project		Validated	Version		Run search	Clear se	arch	
	_		Parameters	1286 /	AEROSOL	Global Ocean Survey of Dissolved Iron and Alumin Aluminum Solubility Supporting the Repeat Hvdroc	um and Aerosol Iron and raphy (CO2) Project	Yes	13 June 2013		мар			
			Affiliations	353	tissolved irop	(CLIVAR AEROSOL)		Yes			O Zoom in	🕕 Query 🎽	Clear query 😡 🤂	
			Funding	54	Fe Speciation	Cobalt, Iron and Micro-organisms from the Upwelli	ng zone to the Gyre	Yes			(-	
			Awards	643	e_Dissolved	(COFEMUG) Rising climatic temperatures impact on antarctic m	icrozooplankton growth and	No	2013-06-27		÷			
		G	EOSPATIAL ACCE	ESS	e Dissolved	grazing (Antarctic microzooplankton) Controls of Ross Sea Algal Community Structure (CORSACS)	No	2013-06-27					
				Nord -	GT10-11 - dFe and	U.S. GEOTRACES North Atlantic Transect (U.S. G	EOTRACES NAT)	Yes	28 Dec 2012					
			AL TO		ане(II) GT10-11 - Fe Mn Zn	U.S. GEOTRACES North Atlantic Transect (U.S. G	EOTRACES NAT)	Yes	27 December		Basin	e		
			2	3	Cd and Cu GT10-11 - Fe	U.S. GEOTRACES North Atlantic Transect (U.S. G	EOTRACES NAT)	Yes	2012 10 Jun 2013			100	1.1	
					Speciation						100000000000000000000000000000000000000	a Carpenter		
		С	ONTRIBUTE DAT	A	utriente and motol-	Cohalt Iron and Micro organisms from the Linux	na zone to the Ouro	Yee	7 October		State State			







1 Woods Hole Oceanographic Institution, Woods Hole, MA 2 Second Creek Consulting, LLC, Columbia, SC



users assess fitness for purpose.

Shannon Rauch¹, Molly D Allison¹, Robert C Groman¹, Cynthia L Chandler¹, Charlton Galvarino², Stephen R Gegg¹, Danie Kinkade¹, Adam Shepherd¹, Peter H Wiebe¹, David M Glover¹

IN31C-1508 11 Dec 2013 Fall AGU





Ongoing Work and Challenges

- Getting feedback. Is our approach working?
- Complexity and heterogeneity of data
- Interoperability with other repositories
- Machine-to-machine data discovery

Acknowledgments

BCO-DMO is funded by the National Science Foundation. We acknowledge the work done by all of the investigators who contribute their data to BCO-DMO and the data managers who work to make those data available. The original user interfaces to the BCO-DMO data system were developed in collaboration with Julie Allen and Katherine Joyce (Woods Hole Oceanographic Institution).

> www.bco-dmo.org info@bco-dmo.org

