1-minute resolution navigation from R2R from R/V Atlantic Explorer and R/V Endeavor cruises AE1211, EN501, EN502, EN513, EN520 in the Bermuda Rise from 2011-2012 (BaRFlux project)

Website: https://www.bco-dmo.org/dataset/3750
Version: 29 July 2013
Version Date: 2013-07-29

Project
» Do interactions between vertically and horizontally transported particles measurably affect particle composition and flux to the sediments? A mechanistic approach. (BaRFlux)

Program
» Ocean Carbon and Biogeochemistry (OCB)

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Dataset Description

One-minute resolution navigation from Rolling Deck to Repository (R2R) for each of the BaRFlux cruises (EN501, EN502, AE1211, EN513, and EN520).

Methods & Sampling

Data were obtained from the NSF R2R Data Catalog.

Data Processing Description

BCO-DMO edits made:
- Created date_utc and time_utc columns from the original ISO_DateTime_UTC.
- Modified parameter names using BCO-DMO naming conventions.

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Data Files

File
one-min_nav.csv (Comma Separated Values (.csv), 9.29 MB) MD5:c15e3916c9f0032767a85aac52f61cfc Primary data file for dataset ID 3750

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Parameters

Parameter	Description	Units
cruise_id	Name/ID number of the cruise.	dimensionless
year	Year, in YYYY format.	YYYY
start_date	Date the cruise started in YYYYmmdd format.	YYYYmmdd
end_date	Date the cruise ended in YYYYmmdd format.	YYYYmmdd
chief_scientist	Name of the chief scientist.	dimensionless
cruise_description	Name of the cruise.	dimensionless
date_utc	Date (UTC) including year (YYYY), month (mm), and day (dd).	YYYYmmdd
time_utc	Time (UTC) in hours, minutes, and decimal minutes.	HHMM.mm
lon	Longitude.	decimal degrees
lat	Latitude.	decimal degrees
sog	Instantaneous speed-over-ground (meters per second).	m/s
cog	Instantaneous course-over-ground.	degrees clockwise from North
ISO_DateTime_UTC	Date and time (UTC) formatted to ISO 8601 standard.	YYYY-mm-ddTHH:MM:SSZ

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Deployments

AE1211

Website	https://www.bco-dmo.org/deployment/58825
Platform	R/V Atlantic Explorer
Start Date	2012-05-06
End Date	2012-05-15
Description	AE1211 is the third of six cruises that span 18 months (one every three months) for the BaRFlux or BR Particles project funded by NSF OCE-1061128. Cruise information is available from UNOLS: http://strs.unols.org/Public/diu_cruise_view.aspx?cruise_id=131972 Cruise track generated from control point navigation data from R2R (23 July 2013). Until 26 November 2012 this cruise was identified by BIOS as AE-X1211. On 26 November 2012, the cruise ID was corrected by BIOS o be the new cruise ID AE1211. This change was also made at BCO-DMO on 26 November 2012. Original cruise data are available from the R2R data catalog

EN501

Website	https://www.bco-dmo.org/deployment/58731
Platform	R/V Endeavor
Start Date	2011-10-26
End Date	2011-11-07
Description	EN501 is the first of six cruises that span 18 months (one every three months) for the BaRFlux or BR Particles project funded by NSF OCE-1061128. Cruise information is available from UNOLS: http://strs.unols.org/Public/diu_cruise_view.aspx?cruise_id=125182 Planned field work for the first BaRFlux cruise includes: deployment and recovery operations of one sediment trap mooring (with multiple traps on the mooring), water pumping, and box/multi-coring at mooring site on the Bermuda Rise. The mooring will consist of 5 sediment trap clusters located at 300, 1000, 1500, 2000, and 4400 meters water depth. Pumping will occur at the trap depths and some closer to the surface, and coring will occur on-site as well. The plan is to do a total of six cruises over 18 months (one every three months). BaRFlux ship requests from UNOLS office (6 cruises total): http://strs.unols.org/public/diu_project_view.aspx?project_id=102618 Cruise information and original data are available from the NSF R2R data catalog.

EN502

Website	https://www.bco-dmo.org/deployment/58791
Platform	R/V Endeavor
Start Date	2012-02-08
End Date	2012-02-20
Description	EN502 is the second of six cruises that span 18 months (one every three months) for the BaRFlux or BR Particles project funded by NSF OCE-1061128. Cruise information is available from UNOLS: http://strs.unols.org/Public/diu_cruise_view.aspx?cruise_id=134848 Cruise information and original data are available from the NSF R2R data catalog.

EN513

Website	https://www.bco-dmo.org/deployment/58853
Platform	R/V Endeavor
Start Date	2012-08-15
End Date	2012-08-27
Description	EN513 is the fourth of six cruises that span 18 months (one every three months) for the BaRFlux or BR Particles project funded by NSF OCE-1061128. Cruise information is available from UNOLS: http://strs.unols.org/Public/diu_cruise_view.aspx?cruise_id=134845. Cruise track generated from control point navigation data from R2R (23 July 2013). Cruise information and original data are available from the NSF R2R data catalog.

EN520

Website	https://www.bco-dmo.org/deployment/58873
Platform	R/V Endeavor
Start Date	2012-11-09
End Date	2012-11-20
Description	EN520 is the fifth of six cruises that span 18 months (one every three months) for the BaRFlux or BR Particles project funded by NSF OCE-1061128. Cruise information is available from UNOLS: http://strs.unols.org/Public/diu_cruise_view.aspx?cruise_id=134850. The study area is the Bermuda Rise (33°41N, 57°36 W). The science party will conduct deployment and recovery operations of one sediment trap mooring (with multiple traps on the mooring), water pumping, and box/multi-coring at a mooring site on the Bermuda Rise. The mooring will consist of 5 sediment trap clusters located at 300, 1000, 1500, 2000, and 4400 m water depth. Pumping will occur at the trap depths and some closer to the surface, and coring will occur on-site as well. Cruise track generated from control point navigation data from R2R (23 July 2013). Cruise information and original data are available from the NSF R2R data catalog.

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Project Information

Do interactions between vertically and horizontally transported particles measurably affect particle composition and flux to the sediments? A mechanistic approach. (BaRFlux)

Coverage: Bermuda Rise

from the NSF award abstract:

The export of many elements from the surface ocean to the deep sea is mediated by the flux of sinking particles; for example, sinking particles account for 50-80% of the vertical transport of organic carbon through the mesopelagic zone. Heterotrophic remineralization of particulate organic carbon (POC) in the open ocean is usually very efficient, as >90% of the POC produced in surface waters is returned to inorganic form in the euphotic zone or during transit through the upper water column. However, a small fraction of the organic matter produced in surface waters survives transit to the deep ocean or seafloor. Similarly, the flux and composition of inorganic material also vary during transport to the sea floor. Perhaps the most obvious example of such modification is the dissolution of carbonate and biogenic silica as they sink through the water column. However, the flux and composition of particulate organic and inorganic matter that reaches the deep sea and sediments depend not just on their source in the surface waters, but also on alteration, supplementation, and selective removal that occurs during vertical transit. In some regions, particularly near margins, lateral transport can also be extensive. Exchange between sinking material and suspended particles or dissolved organic matter via aggregation/disaggregation and solution/dissolution can also influence composition.

In this project, a research team at the State University of New York at Stony Brook is setting out to develop a better mechanistic understanding of the ocean's role in the global carbon cycle and the factors that influence the sedimentary record. Their work addresses five interrelated hypotheses revolving around the themes of remineralization and exchange as particles sink to the sea floor, potential horizontal influences on sinking particles, and how vertical and horizontal transport potentially influence the interpretation of the sediment record. They will apply some of the tools developed during the recent MedFlux program to produce better quantitative models of sinking fluxes by incorporating explicit consideration of ballast minerals (including celestite and barite) and to define better the interactions among particles as they sink. They will also compare results of inorganic, organic and radiochemical analyses of particles sampled by traps and pumps with those of bottom sediments at our proposed site on the Bermuda Rise.

While this is a modern process study, it is expected to have significant paleoceanographic implications. Quantifying the relative vertical and horizontal fluxes of key paleoceanographic proxies in combination with characterization of the seasonal fluxes will greatly enhance our understanding of the existing sediment record at the Bermuda Rise, and improve the quality of future reconstructions as well as lead to more robust

interpretations from other sites with significant lateral input.

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Program Information

Ocean Carbon and Biogeochemistry (OCB)

Website: http://us-ocb.org/

Coverage: Global

The Ocean Carbon and Biogeochemistry (OCB) program focuses on the ocean's role as a component of the global Earth system, bringing together research in geochemistry, ocean physics, and ecology that inform on and advance our understanding of ocean biogeochemistry. The overall program goals are to promote, plan, and coordinate collaborative, multidisciplinary research opportunities within the U.S. research community and with international partners. Important OCB-related activities currently include: the Ocean Carbon and Climate Change (OCCC) and the North American Carbon Program (NACP); U.S. contributions to IMBER, SOLAS, CARBOOCEAN; and numerous U.S. single-investigator and medium-size research projects funded by U.S. federal agencies including NASA, NOAA, and NSF.

The scientific mission of OCB is to study the evolving role of the ocean in the global carbon cycle, in the face of environmental variability and change through studies of marine biogeochemical cycles and associated ecosystems.

The overarching OCB science themes include improved understanding and prediction of: 1) oceanic uptake and release of atmospheric CO2 and other greenhouse gases and 2) environmental sensitivities of biogeochemical cycles, marine ecosystems, and interactions between the two.

The OCB Research Priorities (updated January 2012) include: ocean acidification; terrestrial/coastal carbon fluxes and exchanges; climate sensitivities of and change in ecosystem structure and associated impacts on biogeochemical cycles; mesopelagic ecological and biogeochemical interactions; benthic-pelagic feedbacks on biogeochemical cycles; ocean carbon uptake and storage; and expanding low-oxygen conditions in the coastal and open oceans.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1061128

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