Foram community specimen length and width measurements from multi-stressor experiment (OA, Hypoxia and Warming project)

Website: https://www.bco-dmo.org/dataset/675419
Data Type: experimental
Version:
Version Date: 2017-01-19

Project
» Ocean Acidification, Hypoxia and Warming: Experimental Investigations into Compounded Effects of Global Change on Benthic Foraminifera (OA, Hypoxia and Warming)

Program
» Science, Engineering and Education for Sustainability NSF-Wide Investment (SEES): Ocean Acidification (formerly CRI-OA) (SEES-OA)

Contributors	Affiliation	Role
Bernhard, Joan M.	Woods Hole Oceanographic Institution (WHOI)	Principal Investigator
Copley, Nancy	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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Dataset Description

This dataset contains length and width data for foraminifera specimens used in a multi-stressor experiment, from sediment cores collected at about 75 meters depths from R/V Endeavor EN524 at the 'MudPatch' site on the continental shelf off New England (40.43 N 70.5 W), May 2013.

Methods & Sampling

The original sediments were collected on cruise END524; these results stemmed from a laboratory experiment.

Experimental conditions inside Biospherix C-chambers (hypoxia cell culture chamber) were controlled with Biospherix ProO2 (ProOx?) and ProCO2 sensors and controllers. These Biospherix systems have 2% precision. All samples were from experiment termination (final T = 9C; all started at 7C). Specimens were recovered from >63 µm fraction; viability determined with CellTracker Green CMFDA (Life Technologies). Specimens were placed on micropaleontological slides and measured with a calibrated ocular micrometer. Some genera (Bolivina, Textularia) were not speciated. Some errors in identification were likely, due to small specimen size and inexperience of the high school student who did these measurements as part of a science fair project. For example, some specimens reported as Eggerella advena may have been Textularia and some Stainforthia may have been Bolivina (and vice versa). Nearly all “soft-shelled” foraminifera were excluded from these analyses, as was a fifth treatment (Preindustrial), due to time limitations. Some “soft-shelled” foraminifera were inadvertently dried on slides; if encountered, these were measured and reported.

Data Processing Description

BCO-DMO Processing Notes:
- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions

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Data Files

File
foram_size.csv (Comma Separated Values (.csv), 64.99 KB) MD5:194506c5cd31459ea1ae964346989c16 Primary data file for dataset ID 675419

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Related Publications

Bernhard, J. M., Wit, J. C., & McCorkle, D. C. (2016). ANTHROPOCENE TRIPLE STRESS: IMPACT OF EXPERIMENTALLY INDUCED OCEAN ACIDIFICATION, DEOXYGENATION, AND WARMING ON BENTHIC FORAMINIFERAL COMMUNITY COMPOSITION AND GROWTH. doi:10.1130/abs/2016am-281509
https://doi.org/10.1130/abs/2016AM-281509
General

Bernhard, J.M., J.C. Wit, D. C. McCorkle (2015) Culturing fundamentals used to design and execute a long-term multi-stressor experiments to assess impact of ocean acidification, deoxygenation, and warming on benthic foraminiferal community composition, growth, and carbonate yield. 2015 American Geophysical Union Fall Meeting, San Francisco, abstract #PP52B-01.
General

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Parameters

Parameter	Description	Units
pCO2_ppmv_nominal	set point of CO2 controller	parts per million by volume
treatment	Treatments had different oxygen and/or pCO2. Treatment I = Ambient (control); II = Hypoxic; III = Acidified; IV = Hypoxic + Acidified	unitless
sample	sample identifier	unitless
pseudoreplicate	pseudoreplicate number	unitless
O2_ml_l	dissolved oxygen concentration set point for controller (if present) or saturated value	milliliters/liter
taxon	taxonomic species name	unitless
length_um	foram length	micrometers
width_um	foram width	micrometers

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Microscope - Optical
Dataset-specific Description	To identify and measure forams
Generic Instrument Description	Instruments that generate enlarged images of samples using the phenomena of reflection and absorption of visible light. Includes conventional and inverted instruments. Also called a "light microscope".

Dataset-specific Instrument Name	MC800 multicorer
Generic Instrument Name	Multi Corer
Dataset-specific Description	Used to collect sediment samples
Generic Instrument Description	The Multi Corer is a benthic coring device used to collect multiple, simultaneous, undisturbed sediment/water samples from the seafloor. Multiple coring tubes with varying sampling capacity depending on tube dimensions are mounted in a frame designed to sample the deep ocean seafloor. For more information, see Barnett et al. (1984) in Oceanologica Acta, 7, pp. 399-408.

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Deployments

EN524

Website	https://www.bco-dmo.org/deployment/59031
Platform	R/V Endeavor
Start Date	2013-05-19
End Date	2013-05-22
Description	UNOLS cruise request: http://strs.unols.org/Public/diu_project_view.aspx?project_id=103010 The May cruise is the first for the NSF OCE funded Ocean Acidification, Hypoxia and Warming project also known by the project researchers as "OA Propagule". The cruise was timed such that samples would be collected soon after the spring bloom. During the cruise, investigators plan to collect CTD profile data, including dissolved oxygen, bottom water with Niskin bottles deployed on the CTD rosette, MC800 multicores, and Soutar boxcores from the "Mud Patch" study site. The study area is located on the continental shelf approximately 50 nm south of Martha's Vineyard (40.43 N 70.5 W). The original cruise event log and other underway data submitted by the vessel operator will be available from the NSF R2R cruise catalog. Cruise track image from the University of Rhode Island, the vessel operator.

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Project Information

Ocean Acidification, Hypoxia and Warming: Experimental Investigations into Compounded Effects of Global Change on Benthic Foraminifera (OA, Hypoxia and Warming)

Coverage: continental shelf off New England

from the NSF award abstract:

The average sea surface temperature (SST) has increased over the last 100 years, rising atmospheric partial pressure of carbon dioxide (pCO2) is lowering the pH of the oceans, and the extent and intensity of low-oxygen bottom waters is growing, at least in certain regions. The biological impacts of these ongoing changes -- warming, acidification, and hypoxia -- have each been studied independently, but few studies have explored the possible interactions among these stressors.

This research, led by a scientist from the Woods Hole Oceanographic Institution, studies the compounded

effects of ocean acidification, hypoxia, and warming on an assemblage of benthic foraminifera collected from the continental shelf off New England. Foraminifera are an ideal organism for this work because they (1) are relatively small, allowing experimentation on statistically significant populations; (2) have both calcareous and non-calcareous representatives; (3) are relatively short-lived so experiments include a major portion of their life cycle; (4) include aerobes and anaerobes; and (5) provide a fossil record allowing comparisons across time. Laboratory culturing experiments will be used to determine the response of benthic foraminifera, in terms of survival and growth, to co-varying parameters of pH and oxygen, and to explore the influence of increased temperature on these responses. The researchers will examine the relative effects of higher pCO2, lower [O2], and higher temperature (T) on both calcareous and non-calcareous benthic foraminifera. In addition, they will examine the pre-Industrial benthic foraminiferal assemblage at the field site, and will compare that assemblage to those produced in the experiments under pre-Industrial (lower than current day) and elevated pCO2 levels.

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Program Information

Science, Engineering and Education for Sustainability NSF-Wide Investment (SEES): Ocean Acidification (formerly CRI-OA) (SEES-OA)

Website: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503477

Coverage: global

NSF Climate Research Investment (CRI) activities that were initiated in 2010 are now included under Science, Engineering and Education for Sustainability NSF-Wide Investment (SEES). SEES is a portfolio of activities that highlights NSF's unique role in helping society address the challenge(s) of achieving sustainability. Detailed information about the SEES program is available from NSF (https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504707).

In recognition of the need for basic research concerning the nature, extent and impact of ocean acidification on oceanic environments in the past, present and future, the goal of the SEES: OA program is to understand (a) the chemistry and physical chemistry of ocean acidification; (b) how ocean acidification interacts with processes at the organismal level; and (c) how the earth system history informs our understanding of the effects of ocean acidification on the present day and future ocean.

Solicitations issued under this program:
NSF 10-530, FY 2010-FY2011
NSF 12-500, FY 2012
NSF 12-600, FY 2013
NSF 13-586, FY 2014
NSF 13-586 was the final solicitation that will be released for this program.

PI Meetings:
1st U.S. Ocean Acidification PI Meeting(March 22-24, 2011, Woods Hole, MA)
2nd U.S. Ocean Acidification PI Meeting(Sept. 18-20, 2013, Washington, DC)
3rd U.S. Ocean Acidification PI Meeting (June 9-11, 2015, Woods Hole, MA – Tentative)

NSF media releases for the Ocean Acidification Program:

Press Release 10-186 NSF Awards Grants to Study Effects of Ocean Acidification

Discovery Blue Mussels "Hang On" Along Rocky Shores: For How Long?

Discovery nsf.gov - National Science Foundation (NSF) Discoveries - Trouble in Paradise: Ocean Acidification This Way Comes - US National Science Foundation (NSF)

Press Release 12-179 nsf.gov - National Science Foundation (NSF) News - Ocean Acidification: Finding New Answers Through National Science Foundation Research Grants - US National Science Foundation (NSF)

Press Release 13-102 World Oceans Month Brings Mixed News for Oysters

Press Release 13-108 nsf.gov - National Science Foundation (NSF) News - Natural Underwater Springs Show How Coral Reefs Respond to Ocean Acidification - US National Science Foundation (NSF)

Press Release 13-148 Ocean acidification: Making new discoveries through National Science Foundation research grants

Press Release 13-148 - Video nsf.gov - News - Video - NSF Ocean Sciences Division Director David Conover answers questions about ocean acidification. - US National Science Foundation (NSF)

Press Release 14-010 nsf.gov - National Science Foundation (NSF) News - Palau's coral reefs surprisingly resistant to ocean acidification - US National Science Foundation (NSF)

Press Release 14-116 nsf.gov - National Science Foundation (NSF) News - Ocean Acidification: NSF awards $11.4 million in new grants to study effects on marine ecosystems - US National Science Foundation (NSF)

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1219948

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