Barnacle respiration model results from University of Washington Friday Harbor Laboratories, Friday Harbor WA, Cantilever Point; 2010-2013 (Intertidal Temp Effects project)

Website: https://www.bco-dmo.org/dataset/505869
Version: 28 March 2014
Version Date: 2014-03-28

Project
» The effects of temperature on ecological processes in a rocky intertidal community: a mechanistic approach (Intertidal Temp Effects)

Contributors	Affiliation	Role
Carrington, Emily	University of Washington (FHL)	Principal Investigator
Nishizaki, Michael T.	University of Guelph	Contact
Gegg, Stephen R.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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Dataset Description

Barnacle Respiration Model - Model examining mass transfer versus kinetic limitation of respiration in barnacles

Methods & Sampling

A comparison of the relative importance of mass transfer versus reaction kinetics in limiting respiration rates was conducted using the non-dimensional approach described by Sanford and Crawford (2000).

Sanford, L. and Crawford, S. (2000). Mass transfer versus kinetic control of uptake across solid-water boundaries. *Limnol. Oceangr.* 45, 1180–1186.

Related files and references: Michael T. Nishizaki and Emily Carrington. (in press). The effect of water temperature and flow on respiration in barnacles: patterns of mass transfer versus kinetic limitation *J Exp Biol* http://jeb.biologists.org/content/early/2014/03/04/jeb.101030.abstract

Data Processing Description

BCO-DMO Processing Notes
- Generated from original file "Data_archive_respiration_model.xlsx" contributed by Michael Nishizaki
- Approx Lat/Lon of FHL appended to enable data discovery in MapServer
- Parameter names edited to conform to BCO-DMO naming convention found at Choosing Parameter Name

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Data Files

File
Respiration_Model.csv (Comma Separated Values (.csv), 6.25 KB) MD5:6ff79bf604b9d5bc3e581f2d2230f27c Primary data file for dataset ID 505869

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Parameters

Parameter	Description	Units
Lab_Id	Laboratory identifier where experiments were conducted	text
Lat	Latitude position of platform (South is negative)	decimal degrees
Lon	Longitude position of platform (West is negative)	decimal degrees
Water_velocity	Water velocity	cm/s
Temperature	Water temperature	degrees C
Mass_transfer	Mass transfer	dimensionless
Oxygen_saturation	Oxygen saturation	dimensionless

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Deployments

lab_UW_FHL_OAEL_Carrington

Website	https://www.bco-dmo.org/deployment/59061
Platform	lab UW FHL OAEL
Report	http://depts.washington.edu/fhl/oael.html
Start Date	2010-09-01
End Date	2013-08-31
Description	FHL Ocean Acidification Environmental Laboratory (OAEL) Overview FHL completed construction of a new 1500 sq. ft. experimental facility for ocean acidification research in summer 2011. The facility was funded by an award from NSF's Field Stations and Marine Laboratories (FSML) program, matching funds from the University of Washington, and private donors. The experimental facility currently includes an analytical chemistry laboratory, indoor mesocosms fed by a custom seawater-CO2 blending system and temperature control, laboratory space, as well as outdoor in-water mesocosms. Led by Dr. Emily Carrington, OAEL Director (ecarring@uw.edu), this state-of-the-art ocean acidification facility offers unique research and instructional opportunities for experimental manipulations with on-site monitoring of carbonate system parameters. FHL's location, facilities, and educational mission combine to make an ideal site for the experimental mesocosm and analytical facility.

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Project Information

The effects of temperature on ecological processes in a rocky intertidal community: a mechanistic approach (Intertidal Temp Effects)

Website: http://depts.washington.edu/nucella/

Coverage: San Juan Islands, Washington, USA

(Extracted from the NSF Award abstract)

Temperature influences organismal physiology, behavior, community interactions, and ecosystem function; yet rarely are the mechanisms understood. Accurately predicting the consequences of temperature for a species requires knowledge of: local climatic conditions, the relationship between climate and organismal body temperature, and the physiological and ecological consequences of body temperature. Few studies to date have explored all three areas concurrently. This project will examine in detail the biophysical, physiological, and ecological effects of temperature on a rocky intertidal community, a marine ecosystem that has emerged as a model system for studying the ecological consequences of temperature. It will focus on three major species, representative of rocky marine shore species worldwide: the barnacle, Balanus glandula, its predator Nucella ostrina, and the rockweed Fucus gardneri, which provides shelter for both species. The research is centered around three major goals: to develop biophysical models to explicitly link local climate to organismal body temperatures; to develop energy budget models to relate organismal body temperature to individual performance; and to identify the effect of temperature on interactions among the three species through a series of laboratory and field experiments. This research will provide a model system for understanding the effects of temperature on both individual performance and species interactions. It represents a significant contribution to understanding basic ecological questions, such as the role of temperature in structuring communities, and will also contribute to a more mechanistic understanding of the ecological consequences of future climate changes.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0824903

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