Body size measurements of Mytilus - Lipds from UCSB Mussel Growth study from multiple sites in the California Current System starting 2008 (OMEGAS-II project)

Website: https://www.bco-dmo.org/dataset/639625
Version: 25 February 2016
Version Date: 2016-02-25

Project
» OMEGAS II - Linking ecological and organismal responses to the ocean acidification seascape in the California Current System (OMEGAS-II)

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

Contributors	Affiliation	Role
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Dataset Description

Mussel Growth Data - UCSB - Body size measurements of Mytilus - Lipds

Site Information

Code	Site name
ALG	Alegria
LOL	Lompoc Landing
BML	Bodega Marine Lab
VD	Van Damme
HOP	Hopkins
SOB	Soberanes - Note: SOB mussels are the easiest to insert scalpel in. They are not as tightly closed as other sites
CPA	Cape Arago
SH	Strawberry Hill
FC	Fogerty Creek

Treatment Information

Treatment	pCO2(uatm)	Temperature (C)
R1	300	14
R2	650	12
R3	1200	8
R4	350	18

Methods & Sampling

Mussel body size was measured using calipers. Body mass (wet) was determined using a top loading balance.

Data Processing Description

None -The file contains raw numbers

BCO-DMO Processing Notes
- Generated from original file: "Mussel_datasheet_UCSB.xlsx", sheet: "Lipds" contributed by Gretchen Hofmann
- Parameter names edited to conform to BCO-DMO naming convention found at Choosing Parameter Name
- Lat/Lon of sites added from existing mooring metadata
- "nd" (no data) inserted into blank cells
- Dates reformatted to YYYYMMDD

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Parameters

Parameter	Description	Units
sampleID	sampleID	text
DATE	Date	YYYYMMDD
SITE	Site Id	text
Latitude	Latitude (South is negative)	decimal degrees
Longitude	Longitude (West is negative)	decimal degrees
Replicate	Replicate	nd
width	width	mm
depth	depth	mm
length	length	mm
tin	tin	grams
wetwt_tin	wetwt_tin	grams
wetwt	wetwt	grams
Notes	Notes	text

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Deployments

OMEGAS-CARX00-GIFET

Website	https://www.bco-dmo.org/deployment/58809
Platform	PISCO Cape Arago Ecological Time-Series Station
Report	http://omegas.science.oregonstate.edu/?q=sites
Start Date	2008-04-01
End Date	2020-01-01
Description	surf-zone PAR, chlorophyll fluorescence, and temperature sensors

OMEGAS-FCKX00-GIFET

Website	https://www.bco-dmo.org/deployment/58808
Platform	PISCO Fogarty Creek Intertidal Long-Term Ecological Research Site
Report	http://omegas.science.oregonstate.edu/?q=sites
Start Date	2011-04-17
End Date	2020-01-01
Description	Intertidal (surf-zone) station See also: OMEGAS moorings site page

OMEGAS-IBODXX-GIFET

Website	https://www.bco-dmo.org/deployment/58893
Platform	Bodega Head State Marine Reserve Intertidal Long-Term Ecological Research Site
Report	http://omegas.science.oregonstate.edu/?q=sites
Start Date	2011-05-20
End Date	2020-01-01
Description	Intertidal (surf-zone) station See also: OMEGAS moorings site page

OMEGAS-IHOPXX-GIFET

Website	https://www.bco-dmo.org/deployment/472472
Platform	PISCO-OMEGAS Hopkins Ecological Research Site
Report	http://omegas.science.oregonstate.edu/?q=sites
Start Date	2012-04-24
End Date	2020-01-01
Description	Intertidal (surf-zone) station See also: OMEGAS moorings site page

OMEGAS-ILOLXX-GIFET

Website	https://www.bco-dmo.org/deployment/58894
Platform	PISCO Lompoc Landing Intertidal Long-Term Ecological Research Site
Report	http://omegas.science.oregonstate.edu/?q=sites
Start Date	2011-05-05
End Date	2020-01-01
Description	Intertidal (surf-zone) station See also: OMEGAS moorings site page

OMEGAS-ISOPXX-GIFET

Website	https://www.bco-dmo.org/deployment/559904
Platform	PISCO Soberanes Ecological Time-Series Station
Report	http://omegas.science.oregonstate.edu/?q=sites
Start Date	2013-04-01
End Date	2020-01-01
Description	surf-zone PAR, chlorophyll fluorescence, and temperature sensors

OMEGAS-IVDPXX-GIFET

Website	https://www.bco-dmo.org/deployment/58896
Platform	Van Damme State Park Intertidal Long-Term Ecological Research Site
Report	http://omegas.science.oregonstate.edu/?q=sites
Start Date	2011-05-09
End Date	2020-01-01
Description	Intertidal (surf-zone) station See also: OMEGAS moorings site page

OMEGAS-SHLX00-GIFET

Website	https://www.bco-dmo.org/deployment/58807
Platform	PISCO Strawberry Hill Intertidal Long-Term Ecological Research Site
Report	http://omegas.science.oregonstate.edu/?q=sites
Start Date	2011-04-17
End Date	2020-01-01
Description	Intertidal (surf-zone) station See also: OMEGAS moorings site page

OMEGAS-ALEXX-GIFET

Website	https://www.bco-dmo.org/deployment/639614
Platform	PISCO Alegria Ecological Time-Series Station
Start Date	2010-01-01
End Date	2013-12-31

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Project Information

OMEGAS II - Linking ecological and organismal responses to the ocean acidification seascape in the California Current System (OMEGAS-II)

Website: http://omegas.science.oregonstate.edu

Coverage: California Current Large Marine Ecosystem, Oregon, California

Project abstract:

This project is a renewal of an existing ocean acidification (OA) grant supporting an interdisciplinary research team (called OMEGAS) with expertise in oceanography, ecology, biogeochemistry, molecular physiology, and molecular genetics. Research to date has documented a dynamic oceanographic mosaic in the inner shelf of the California Current System (CCS) that spans 1,200+ km and varies at tidal, diurnal, event, and seasonal temporal scales at local to ocean basin spatial scales. In OMEGAS II, the project seeks to better understand the drivers of this striking time-space variability, and to link the OA seascape to the physiological and ecological performance of a key member of this ecosystem, the mussel Mytilus californianus. In addition, the investigators will explore the influence of this oceanographic mosaic on species interactions and community organization. As a dominant habitat-forming species, strong interactor, and major space occupant, M. californianus is arguably the core component of the rocky intertidal ecosystem along the upwelling-dominated CCS. Using an interdisciplinary, spatially extensive approach integrating inner shelf oceanography with ecology, physiology, and eco-mechanics, the interdisciplinary team will study the response of juvenile mussels M.

californianus to OA. The studies span levels of biological organization, thereby allowing assessment of how the cost of forming a shell under field conditions might influence physiological performance and resistance to predation. This investigation will include modeling to link to larger-scale ecosystem and oceanographic dynamics in the CCS and beyond.

Results from OMEGAS I show that the growth, survival, and shell strength of mussel larvae are strongly negatively affected by elevated pCO2, and that growth of adult mussels varied among sites within regions and between regions. Emerging data on natural variability in seawater conditions will allow a deeper exploration of the organismal response of M. californianus, and the ecological consequences of traits, such as reduced shell thickness and strength. The present project will expand and strengthen the existing oceanographic network to increase our understanding of the coastal OA regime, and provide the environmental context for ecological and physiological research. Specifically, this project will (1) conduct field and laboratory experiments on the influence of OA on the growth, shell accretion, and resistance to predation of juvenile mussels collected from 10 sites spanning 1,400 km of coastline, (2) link the OA-sensor oceanographic "backbone" to an existing database of community structure via ecological modeling to assess the influence of OA on coastal variation in community organization, (3) determine the physiological responses of juvenile mussels following field deployments and culture under common garden conditions to evaluate mechanistic underpinnings to the responses observed in mussels from different sites, (4) explore the physiological and transcriptomic response of mussels in lab mesocosms to field-documented variability in pCO2, and (5) using modified ROMS models, evaluate the linkage between basin-scale oceanography and local-scale variation in inner-shelf oceanography to evaluate the relative influences of large-to-local scale factors on OA variability. This research aims to understand how coastal ecosystems will respond to OA, and thus to develop our capacity to predict the future impact of OA on coastal ecosystems.

PUBLICATIONS PRODUCED AS A RESULT OF THIS RESEARCH

Hettinger, A., E. Sanford, T. M. Hill, J. D. Hosfelt, A. D. Russell, and B. Gaylord.. "The influence of food supply on the response of Olympia oyster larvae to ocean acidification.," *Biogeosciences*, v.10, 2013, p. 6629.

Hettinger, A., E. Sanford, T.M. Hill, E.A. Lenz, A.D. Russell, and B. Gaylord. "Larval carry-over effects from ocean acidification persist in the natural environment.," *Global Change Biology*, 2013.

Hofmann, G. E., T. G. Evans, M. W. Kelly, J. L. Padilla-Gamiño, C. A. Blanchette, L. Washburn, F. Chan, M. A. McManus, B. A. Menge, B. Gaylord, T. M. Hill, E. Sanford, M. LaVigne, J. M. Rose, L. Kapsenberg, and J. M. Dutton.. "Exploring local adaptation and the ocean acidification seascape ? studies in the California Current Large Marine Ecosystem.," *Biogeosciences Discussions*, v.10, 2013, p. 11825.

LaVigne, M. T.M. Hill, E. Sanford, B. Gaylord, A.D. Russell, E.A. Lenz, J.D. Hosfelt, M.K. Young.. "The elemental composition of purple sea urchin (Strongylocentrotus purpuratus) calcite and potential effects of pCO2 during early life stages.," *Biogeosciences*, v.10, 2013, p. 3465.

Pespeni, M.H., E. Sanford, B. Gaylord, T. M. Hill, J. D. Hosfelt, H. Jaris, M. LaVigne, E. A. Lenz, A. D. Russell, M. K. Young, S. R. Palumbi.. "Evolutionary change during experimental ocean acidification.," *Proceedings National Academy of Sciences*, v.110, 2013, p. 6937.

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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-1220359

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