Multiple Opening and Closing Net Environmental Sampling System (MOCNESS) water filtering volumes from 2018 and 2019 taken in the Northern California Current waters.

Website: https://www.bco-dmo.org/dataset/783036
Data Type: Cruise Results
Version: 2
Version Date: 2023-02-16

Project
» Collaborative Research: Mesozooplankton food webs in intermittent upwelling systems: An overlooked link in a productive ocean (MEZCAL)

Contributors	Affiliation	Role
Cowen, Robert K.	Oregon State University (OSU-HMSC)	Principal Investigator
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Abstract
Multiple Opening and Closing Net Environmental Sampling System (MOCNESS) water filtering volumes from 2018 and 2019 taken in the Northern California Current waters sampled aboard the R/V Sikuliaq, R/V Sally Ride and R/V Atlantis.

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Coverage

Spatial Extent: **N**:44.652 **E**:-124.267 **S**:41.0583 **W**:-125.117
Temporal Extent: 2018-02-17 - 2019-07-25

Methods & Sampling

Sampling happend along two transects in winter and in summer 2018 and 2019. One transect was off of Trinidad Head, CA and the other Newport, OR (See Figure in Supplemental Docs). Each transect consisted of five target stations during the day and at night with replicate tows at each station. However, this sampling design was often modified at sea. Please refer to the dataset for completed stations.

To sample a range of zooplankton simultaneously, a coupled Multiple Opening and Closing Net Environmental Sampling System (MOCNESS) consisting of a 4m2 net fitted with 1 mm mesh and a 1 m2 net with 150 µm

mesh was used (Guigand et al. 2005). The former is referred to as the Moc4 and the latter the Moc1. The Moc4 and Moc1 each have 5 nets (numbered 0-4) to sample discrete depths. Please see above for depth descriptions. All tows were sent to a target depth of 100 m.

Data Processing Description

All data were processed in R (v. 3.6.1).

BCO-DMO Processing Notes:

- Adjusted column headers to meet database requirements
- Reformatted date and start/end times to ISO format (UTC, timezone)
- Round net volumes to 2 decimals

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Data Files

File
mocness_volumes.csv (Comma Separated Values (.csv), 57.83 KB) MD5:d610844b3d72086eeaf2cde1ea42f088 Primary datafile for dataset 783036, version 2.

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Supplemental Files

File
MOCNESS Towing Stations filename: NH_and_TR_stations_bathy.png (Portable Network Graphics (.png), 30.10 KB) MD5:5092794b987cd197ca6344dc3ca99da5 MOCNESS towing stations related to BCO-DMO dataset 783036 in .png format. Towing stations with bathymetry basemap.

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Related Publications

Guigand, C. M., Cowen, R. K., Llopiz, J. K., & Richardson, D. E. (2005). A Coupled Asymmetrical Multiple Opening Closing Net with Environmental Sampling System. Marine Technology Society Journal, 39(2), 22–24. doi:10.4031/002533205787444042
Methods

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Related Datasets

IsSourceOf

Sutherland, K. R., Cowen, R. K., Sponaugle, S., Lyle, J. (2022) **Pyrosome (Pyrosoma atlanticum) samples from MOCNESS tows in the Northern California Current.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2021-12-10 doi:10.26008/1912/bco-dmo.866663.1 [view at BCO-DMO]

Relationship Description: Used to calculated the MOCNESS filtered volumes.

IsReferencedBy

Cowen, R. K., Sponaugle, S., Sutherland, K. R., Swieca, K. (2023) **Larval fish identifications and concentration (individuals per 1000m3) estimates for all day samples.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2023-02-01 doi:10.26008/1912/bco-dmo.888753.1 [view at BCO-DMO]

Cowen, R. K., Sponaugle, S., Sutherland, K. R., Swieca, K. (2023) **Standard length measurements of a representative subset of northern anchovy (Engraulis mordax) and Stenobrachius leucopsarus collected with MOCNESS during winter and summer sampling in 2019 aboard R/V Sikuliaq, R/V Sally Ride and R/V Atlantis.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2022-01-10 doi:10.26008/1912/bco-dmo.867668.1 [view at BCO-DMO]
Relationship Description: Standard length measurements of northern anchovy (Engraulis mordax)of MOCNESS samples.

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Parameters

Parameter	Description	Units
Cruise	Cruise identification number: S=summer; W=winter; 18=2018 ; 19=2019	unitless
Location	Sampling location: NH=Newport or TR=Trinidad Head; CA	unitless
Station	Location along transect: 1=closest nearshore; 5=furthest offshore	unitless
Transect	Sampling transect: MaN=First night transect; MbN=Second replicate night transect; MaD=First day transect; MbD=Second replicate day transect	unitless
Haul	A station identifier for labeling purposes and quick reference. Station weret consecutively numbered as they were sampled.	unitless
Net_no	Net open on MOCNESS: 0=oblique; 1=100-75m; 2=75-50m; 3=50-25m; 4=25m-surface	unitless
moc_1_volume_m3	Filtered volume by a net with a 4m2 opening and fitted with a 1 mm mesh	liter per cubic meter (l/m3)
moc_4_volume_m3	Filtered volume by a net with a 1m2 opening and fitted with a 150 um mesh	liter per cubic meter (l/m3)
ISO_DateTime_UTC_Start	Date /Time of the start of the net towing in UTC timezone, ISO formatted (yyyy-mm-ddTHH:MM:SSZ)	units

ISO_DateTime_UTC_End	Date /Time of the end of the net towing in UTC timezone, ISO formatted (yyyy-mm-ddTHH:MM:SSZ)	units
Station_lat	Latitude of tow start location, south is negative	decimal degrees
Station_lon	Longitude of tow end location, west is negative	decimal degrees
Notes	At certain stations only oblique tows were done, these are indicated by 'oblique' in the Notes section	unitless
time_start_GMT	Time of the start of the net towing in UTC timezone, ISO formatted (HH:MM:SS)	unitless
time_end_GMT	Time of the end of the net towing in UTC timezone, ISO formatted (HH:MM:SS)	unitless
Date	Sample date in GMT timezone, ISO format (yyyy-mm-dd).	unitless

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	MOCNESS
Dataset-specific Description	The MOCNESS systems consists of a 4m2 net fitted with 1 mm mesh and a 1 m2 net with 150 µm mesh (Guigand et al. 2005). The former is referred to as the Moc4 and the latter the Moc1. The Moc4 and Moc1 each have 5 nets (numbered 0-4) to sample discrete depths.
Generic Instrument Description	The Multiple Opening/Closing Net and Environmental Sensing System or MOCNESS is a family of net systems based on the Tucker Trawl principle. There are currently 8 different sizes of MOCNESS in existence which are designed for capture of different size ranges of zooplankton and micro-nekton Each system is designated according to the size of the net mouth opening and in two cases, the number of nets it carries. The original MOCNESS (Wiebe et al, 1976) was a redesigned and improved version of a system described by Frost and McCrone (1974). (from MOCNESS manual)

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Deployments

SKQ201804S

Website	https://www.bco-dmo.org/deployment/783051
Platform	R/V Sikuliaq
Start Date	2018-02-17
End Date	2018-02-23

SR1810

Website	https://www.bco-dmo.org/deployment/783078
Platform	R/V Sally Ride
Start Date	2018-07-06
End Date	2018-07-11

SKQ201903S

Website	https://www.bco-dmo.org/deployment/837039
Platform	R/V Sikuliaq
Start Date	2019-03-03
End Date	2019-03-12

AT42-13

Website	https://www.bco-dmo.org/deployment/837042
Platform	R/V Atlantis
Start Date	2019-07-15
End Date	2019-07-26

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Project Information

Collaborative Research: Mesozooplankton food webs in intermittent upwelling systems: An overlooked link in a productive ocean (MEZCAL)

Coverage: Northern California Current

This project will examine the coastal ocean mesozooplankton community and their predation by early life stages of fish in the northern California Current. The goal is to understand how these predator-prey interactions change during different oceanographic regimes that vary seasonally in the region. This study will use a very high-resolution imaging system coupled with net samples to measure trophic interactions within the zooplankton community across a range of environmental parameters (e.g., temperature, relative timing and intensity of upwelling). The camera provides detailed information on the fine-scale abundance and spatial distributions of a wide diversity of plankton, while the net samples will provide biological samples for diet-related analyses. This project will train 12 undergraduate and two graduate students and one post-doctoral scholar. The research team will develop a variety of educational activities and products to facilitate greater outreach to public audiences. Plankton imagery from this project will be used to build the Global Plankton Imagery Library, an open-access repository for plankton imagery that will be a resource for the research community. The researchers will expand the imagery available in the Plankton Portal, a public website they developed in partnership with the Citizen Science Alliance's Zooniverse, that invites citizen scientists to participate in classifying plankton from field photographs. They will collaborate with Science Education specialists to include

Plankton Portal kiosks in a new public exhibit at the Oregon State University's Hatfield Marine Science Center (HMSC) Visitor Center, which annually hosts 150,000 visitors of all ages. Importantly, this activity will not only educate K-12 and beyond, but will enable researchers to study what factors motivate citizen scientists, what characterizes "heavy-users", and how those users can be supported and encouraged into advanced collaborator roles. A multi-media artist will join the research cruises as part of the new Artist-At-Sea program. Their artwork will be displayed at the HMSC Visitor Center and University of Oregon's Charleston Marine Life Center and a scaled traveling show will tour Oregon metropolitan areas and underserved communities.

Eastern boundary currents are among the most productive marine ecosystems on the planet and support a significant proportion of global fisheries, yet there are unanswered questions about the role of non-crustacean zooplankton in transferring production through upwelling food webs. This study will answer key questions about the food web dynamics associated with mesozooplankton linkages, sources of carbon production, and consequences for upper trophic levels in different shelf upwelling systems. Not only is there a knowledge gap in how the food web currently functions in transition areas of major eastern boundary current systems, but there is increasing evidence that these systems are changing. Regional and global shifts in major currents, including upwelling strength, together with temperature-induced latitudinal shifts in species ranges that are already occurring and predicted to continue will have major effects on interactions among species, and consequently, food webs. Understanding these interactions and predicting future changes is highly relevant to science, society, and economies. The researchers plan to sample the winter and summer seasons in the northern California Current off central Oregon (intermittent upwelling) and northern California (continuous upwelling) with the high resolution In Situ Ichthyoplankton Imaging System to obtain an accurate description of mesozooplankton communities: their abundances, and horizontal and vertical spatial distributions, over contrasting upwelling/downwelling system dynamics. In parallel, they plan to collect depth-discrete mesozooplankton samples to quantify seasonal diets for larval fishes and gelatinous zooplankton and prey-specific growth rates of larval fishes. Stable isotope analysis of mesozooplankton predators and prey will reveal the relative role of new vs. regenerated production in sustaining food webs such major eastern boundary currents.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1737399
NSF Division of Ocean Sciences (NSF OCE)	OCE-1737364

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