Larval fish identifications and concentration (individuals per 1000m3) estimates for all day samples.

Website: https://www.bco-dmo.org/dataset/888753
Data Type: Cruise Results
Version: 1
Version Date: 2023-02-01

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)	Principal Investigator
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Abstract
Larval fish identifications and concentration (individuals per 1000m3) estimates for all day samples.

Table of Contents

- Coverage
- Dataset Description
  - Methods & Sampling
  - Data Processing Description
- Data Files
- Supplemental Files
- Related Publications
- Related Datasets
- Parameters
- Instruments
- Deployments
- Project Information
- Funding

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

We sampled along two transects in the winters and summers of 2018 and 2019. One transect was off of Trinidad Head, CA and the other Newport, OR (See MOCNESS Towing stations, supplemental files). 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. This dataset describes daytime samples only.

To sample a range of zooplankton simultaneously, a coupled Multiple Opening and Closing Net Environmental Sensing System (MOCNESS) consisting of a 4m2 net fitted with 1 mm mesh and a 1 m2 net with 333 µm mesh (Guigand et al. 2005) was used. 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

Immediately after MOCNESS retrieval, nets were rinsed with seawater, sieved, and individually preserved in 95% ethanol. Ethanol was changed within 48 h of collection and again within two months to properly preserve larvae. MOCNESS samples were sorted in the laboratory and fish larvae were enumerated and identified to the lowest possible taxonomic level. Individual taxa concentrations (ind 1000 m-3) were calculated by dividing biological counts from each net by the volume of water filtered through the net.

BCO-DMO processing notes:
* Added figure of MOCNESS Towing stations

[table of contents | back to top]

Data Files

File
ichthyoplankton_concentration.csv (Comma Separated Values (.csv), 422.63 KB) MD5:ee503667eb8dbaba486a0bd20f6bd12d Primary data file for dataset 888753

[table of contents | back to top]

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.

[table of contents | back to top]

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

[table of contents | back to top]

Related Datasets

References

Cowen, R. K., Sponaugle, S., Sutherland, K. R. (2023) **Multiple Opening and Closing Net Environmental Sampling System (MOCNESS) water filtering volumes from 2018 and 2019 taken in the Northern California Current waters.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 2) Version Date 2023-02-16 doi:10.26008/1912/bco-dmo.783036.2 [view at BCO-DMO]

[table of contents | back to top]

Parameters

Parameter	Description	Units
Cruise	Cruise identifier: W18=Winter 2018; S18=Summer 2018, W19=Winter 2019; S19=Summer 2019	unitless
Haul_number	Sample identifier: combination of Haul Number - Haul - Moc	unitless
Haul	A station identifier for labeling purposes and quick reference. Station were consecutively numbered as they were sampled.	unitless
Moc	Net type: 1=Moc1, 1m2 opening 333 um mesh; 4=Moc4, 4m2 opening 1 mm mesh	unitless
Net_number	Net open on MOCNESS: 0=oblique; 1=100-75m depth; 2=75-50m depth; 3=50-25m depth; 4=25m-surface	unitless
time_start_GMT	Time of the start of the net towing in UTC timezone, ISO formatted (HH:MM:SSZ)	unitless
time_end_GMT	Time of the end of the net towing in UTC timezone, ISO formatted (HH:MM:SSZ)	unitless
Station_lat	Latitude of tow start location, south is negative	decimal degrees
Station_lon	Longitude of tow end location, west is negative	decimal degrees
Season	Sampling season: winter or summer	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: MaD=First day transect, MbD=Second (replicate)day transect	unitless
Family	Fish family	unitless
Species	Fish species	unitless
Fish_count	Counted fish larvae in filtered volume	unitless
Net_volume_filtered_m3	Filtered volume	liter per cubic meter (l/m3)
Fish_concentration_1000m3	Fish concentration (fish count * 1000)/volume filtered	species per cubic meter*1000
Date	Sample date in GMT timezone, ISO format (yyyy-mm-dd).	unitless
ISO_DateTime_UTC_Start	Start time and date of sampling, UTC time zone, ISO formatted.	unitless
ISO_DateTime_UTC_End	End time and date of sampling, UTC time zone, ISO formatted.	unitless

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	Multiple Opening and Closing Net Environmental Sensing System (MOCNESS)
Generic Instrument Name	MOCNESS
Dataset-specific Description	A coupled Multiple Opening and Closing Net Environmental Sensing System (MOCNESS) consisting of a 4m2 net fitted with 1 mm mesh and a 1 m2 net with 333 µm mesh was used.
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) This designation is used when the specific type of MOCNESS (number and size of nets) was not specified by the contributing investigator.

[table of contents | back to top]

Deployments

SKQ201804S

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

SKQ201903S

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

SR1810

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

AT42-13

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

[table of contents | back to top]

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.

[table of contents | back to top]

Funding

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

[table of contents | back to top]