

MOCNESS tow zooplankton abundance estimates from R/V New Horizon cruise NH1008 in Monterey Bay, near MBARI buoy M1 (36.747°N, 122.022°W); 2010 (GATEKEEPERS project)

Website: <https://www.bco-dmo.org/dataset/540832>

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Project

» [Zooplankton feeding at the base of the particle maximum: Gatekeepers of the Vertical Flux?](#) (GATEKEEPERS)

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Dataset Description

The abundance (# m⁻³, ppm) for selected taxa in each analyzed MOCNESS deployment averaged over upcast nets.

Related reference:

Dagg, M.J., G.A. Jackson, and D.M. Checkley, Jr. (in press). The distribution and vertical flux of fecal pellets from large zooplankton in Monterey Bay and coastal California." *Deep-Sea Research Part I*.

Methods & Sampling

Sample Collection: Samples were collected using a 1-m² MOCNESS net with 202-micron-mesh nets, pressure sensor and flowmeter. Tow speed was generally 0.5-1 m sec⁻¹. Only those samples from selected net openings were analyzed and only data from those analyses are provided. In general, for each MOCNESS deployment, samples from 3-5 nets opened and closed sequentially from the lowest depth (zl, m) to the shallowest, or upper, depth (zu, m) were analyzed. We present here the abundances for selected taxa enumerated in each deployment averaged over all upcast samples.

Data Processing Description

Sample Analysis: Samples were split multiple times using a Folsom splitter. Specific taxa were identified and enumerated in one or more splits using a dissecting microscope. Equivalent spherical diameter (ESD) was

estimated from length and width and assuming a geometric shape for individual taxa. For discretely sized taxa (*Calanus pacificus* adult females, adult males, and fifth copepodites: C.pac AF, AM, C5; *Metridia pacifica* adult females: M.pac AF; *Euclanus californicus* adult males, adult females, and fourth and fifth copepodites: E.cal AF, AM, C4,C5) mean ESD was calculated from all nets together. For other taxa (other large cops, euphausiids, and small zooplankton), mean ESD was calculated for each net where present and the means were weighted to estimate the mean ESD for all nets. Mean volume was calculated from mean ESD for each taxon using the equation $\frac{1}{6}\pi (\text{mean ESD})^3$. Abundance of each taxon was calculated by multiplying counts in each net by their corresponding split factors, summing over all nets and dividing by the sum volume filtered for all nets. Mean volume was multiplied by abundance for each taxon to calculate volume in cm^3m^{-3} or ppm. Number of individuals measured and counted in each taxonomic group was retained to display where low counts produce uncertainty in calculations.

BCO-DMO Processing Notes

- Generated from original file: "NH1008_MN_integrated_zoop_16sept13_jfb_no_header.xlsx" contributed by David Checkley
- Parameter names edited to conform to BCO-DMO naming convention found at [Choosing Parameter Name](#)
- "MOCNESS_" pre-pended to Tow Id for consistency with MOCNESS stations tow ids
- Date/Time and Lat/Lon deployed added to each record from MOCNESS stations to enable use in MapServer

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Data Files

File
MOCNESS_Zoop.csv (Comma Separated Values (.csv), 11.42 KB) MD5:af3967e693224aaf87cb4b6f94c396f8
Primary data file for dataset ID 540832

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Parameters

Parameter	Description	Units
Taxon	Taxon enumerated in respective net tow	text
MN_Tow	Sequential number of MN deployment	Dimensionless
Date_Deployed	Deployment Date (PDT)	YYYYMMDD
Time_Deployed	Deployment Time (PDT)	HHMM
Latitude_Deployed	Deployment Latitude (South is negative)	decimal degrees
Longitude_Deployed	Deployment Longitude (West is negative)	decimal degrees
zl	Estimated deepest depth of tow	meters
zu	Upper depth (in this case the surface)	meters
Abund	Numerical abundance averaged over depth of tow	individuals m ⁻³
Vol	Volumetric abundance averaged over depth of tow	ppm
Number_Measured	Number of individuals measured to estimate mean Equivalent spherical diameter (ESD)	individuals
Number_Counted	Number of individuals counted to estimate abundance	individuals

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Instruments

Dataset-specific Instrument Name	Folsom Splitter
Generic Instrument Name	Folsom Plankton Splitter
Dataset-specific Description	Samples were split multiple times using a Folsom splitter.
Generic Instrument Description	A Folsom Plankton Splitter is used for sub-sampling of plankton and ichthyoplankton samples.

Dataset-specific Instrument Name	MOCNESS
Generic Instrument Name	MOCNESS
Dataset-specific Description	Samples were collected using a 1-m ² MOCNESS net with 202-micron-mesh nets, pressure sensor and flowmeter. Tow speed was generally 0.5-1 m sec ⁻¹ . Only those samples from selected net openings were analyzed and only data from those analyses are provided. In general, for each MOCNESS deployment, samples from 3-5 nets opened and closed sequentially from the lowest depth (zl, m) to the shallowest, or upper, depth (zu, m) were analyzed
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.

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Deployments

NH1008

Website	https://www.bco-dmo.org/deployment/58852
Platform	R/V New Horizon
Report	http://bcodata.whoi.edu/GATEKEEPERS/cruise_plan_checkley_nh_8_25_jul_10_v3.pdf
Start Date	2010-07-08
End Date	2010-07-25
Description	Collaborative Research: Zooplankton at the Base of the Particle Maximum: Gatekeepers of the Vertical Flux?: Deployment and recovery of SOLOPCs in Monterey Bay, plus CTD and MOCNESS deployments in Monterey Bay Cruise information and original data are available from the NSF R2R data catalog. Figure 1. R/V New Horizon Cruise NH1008 GATEKEEPERS [click on the image to view a larger version]

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Project Information

Zooplankton feeding at the base of the particle maximum: Gatekeepers of the Vertical Flux? (GATEKEEPERS)

Website: <http://iod.ucsd.edu/gatekeeper/>

Coverage: Monterey Bay, CA and waters offshore

Zooplankton feeding at the base of the particle maximum: Gatekeepers of the Vertical Flux?

A range of observations suggest that zooplankton act as gatekeepers for material leaving the euphotic zone. This study will investigate the interactions of zooplankton with other particles using a suite of autonomous and

tethered instruments in conjunction with finescale water sampling. The SOLOPC (Sounding Oceanographic Observer with Laser Optical Plankton Counter) will be the autonomous instrument and provide hourly profiles of zooplankton and other particles. Previous sampling with the SOLOPC indicated a diel cycle of production and abundance of particles in the euphotic zone and their sinking and consumption, presumably by zooplankton observed at the base of the particle abundance maximum. The SOLOPC senses particles, including zooplankton and aggregates, and measures their equivalent spherical diameters which can be used to compute particle size spectra. However, it is difficult to use the SOLOPC to distinguish among particle types, such as copepods, larvaceans, and aggregates, particularly if they are small. The research will include an intensive field study that will take place in Monterey Bay and use adaptive sampling to observe near SOLOPCs with a new, AUV-borne imaging system, ship-based CTD and MOCNESS sampling, and MBARI's ROV Ventana. The investigators will alter a SOLOPC to be stationary relative to an isopycnal and use the particle counts that it accumulates to calculate a flux spectrum. They will combine the flux and concentration spectra to estimate particle sinking velocities as a function of particle diameter. Zooplankton feeding in the water column will be estimated by analyzing the gut fluorescence of animals caught in zooplankton nets and by counting the distribution of fecal pellets in water samples. Results will enhance the understanding of the role of the zooplankton as gatekeepers in the vertical flux of particles and, hence, the biological pump. The study will also provide new insight into factors that affect zooplankton behavior and ecology.

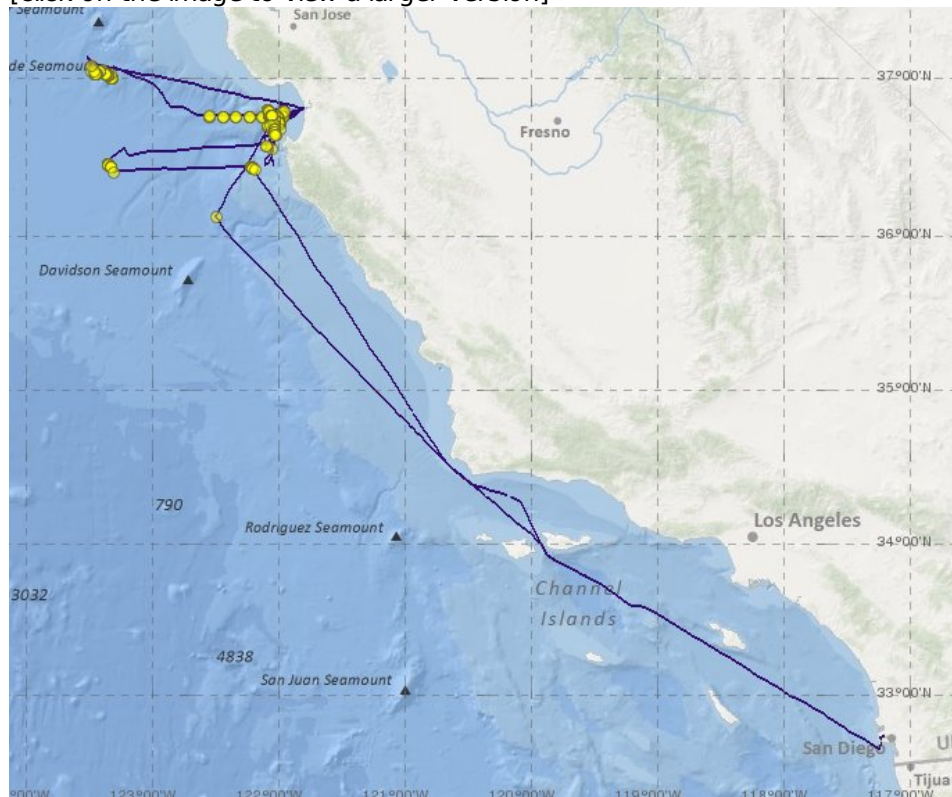
Collaborating institutions include SIO, TAMU, LUMCON, MBARI, BIO, and Université Paris VI. The SOLOPC, modified to measure flux as well as profile, and REFLICS are intended for acquisition and use by other researchers worldwide. The understanding we gain of role of the zooplankton as gatekeepers of the vertical flux will contribute valuably to understanding of the biological pump and the carbon cycle.

PUBLICATIONS PRODUCED AS A RESULT OF THIS RESEARCH

Jackson, GA and DM Checkley Jr. "Particle size distributions in the upper 100 m water column and their implications for animal feeding in the plankton," *Deep-Sea Research*, 2011.

Figure 1. R/V New Horizon Cruise NH1008 GATEKEEPERS

[click on the image to view a larger version]



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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0927863
NSF Division of Ocean Sciences (NSF OCE)	OCE-0928139
NSF Division of Ocean Sciences (NSF OCE)	OCE-0928425

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