Biomass data from an Optical Plankton Counter (OPC) collected on R/V New Horizon, R/V Thomas G. Thompson, and R/V Roger Revelle cruises NH0005, NH0007, T0205, and R0208 in the Northeast Pacific from 2000-2002 (NEP project)

Website: https://www.bco-dmo.org/dataset/3744
Data Type: Cruise Results
Version: 1
Version Date: 2012-10-16

Project
» U.S. GLOBEC Northeast Pacific (NEP)

Program
» U.S. GLOBal ocean ECosystems dynamics (U.S. GLOBEC)

Contributors	Affiliation	Role
Zhou, Meng	University of Massachusetts Boston (UMB-SMS)	Principal Investigator
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Abstract
Biomass data from an Optical Plankton Counter (OPC) collected on R/V New Horizon, R/V Thomas G. Thompson, and R/V Roger Revelle cruises NH0005, NH0007, T0205, and R0208 in the Northeast Pacific from 2000-2002.

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Coverage

Spatial Extent: **N**:44.6665 **E**:-103.0707 **S**:39.0004 **W**:-128.8078
Temporal Extent: 2000-05-30 - 2002-08-13

Dataset Description

This dataset includes ALL the biomass values, zero and non-zero. OPC size classes are diplayed in the 'size_class' column, rather than in separate columns, with biomass for each class in the 'biomass' column. For the original presentation of the data, see opc_ccs_orig. For a version of the data with only non-zero data, see opc_ccs_nonzero. In the 'nonzero' dataset, values of 0 in the biomass column have been removed.

U.S. GLOBEC Northeast Pacific California Current Program
Optical Plankton Counter (OPC) Data

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This project addresses one of 3 central hypotheses of the U.S. GLOBEC Northeast Pacific (NEP) Study:

Spatial and temporal variability in mesoscale circulation constitutes the dominant physical forcing on zooplankton biomass, production, distribution, species interactions and retention and loss in coastal regions.(U.S. GLOBEC Northeast Pacific Implementation Plan, U.S. GLOBEC Report No. 17).

References:

Rodriguez, J. and M. M. Mullin. 1986. *Relation between biomass and body weight of plankton in a steady state oceanic ecosystem.* Limnol. Oceanogr., **31**, 361-370.
Zhou, M. and M. E. Huntley. 1997. *Population dynamics theory of plankton based on biomass spectra.* Mar. Ecol. Prog. Ser., **157**, 61-73.
Zhou, M. and K. S. Tande. 2002. *Optical Plankton Counter workshop report.* International Global Ocean Ecosystems Dynamics Program Report, **No. 17**, 67 pp.

For more Information about these data contact Dr. Zhou.

Last modified: June 29, 2006

Acquisition Description

We attached an Optical Plankton Counter (see Zhou and Tande, 2002) to the OSU towed body (SeaSoar) to make 3-dimensional mesoscale surveys (in a 100-km-wide coastal region from Newport, Oregon to Crescent City, California) aimed at determining the distribution and productivity of zooplankton in relation to their physical environment. The OPC provides counts and size estimates of zooplankton sized particles that pass through the instrument. The OPC data with other data sets (e.g., acoustics; ADCP-derived velocities) collected on these surveys, and from companion ships doing net sampling of zooplankton will allow estimation of growth and mortality rates of zooplankton using the biomass spectra method (Zhou and Huntley, 1997).

The OPC-CCS data are organized on the GLOBEC server by transect within cruise. The master (level0) page lists all of the cruises--there were two cruises in each of 2000 and 2002. Clicking on a cruise will show all of the casts collected and processed from that cruise (Level1), along with the start date and time of the transect. Clicking on a cast will bring up the Level2 file that shows OPC profile data. The raw data stream is averaged and output at every 4-m bin. The towed body undulates between a near-surface, shallow depth and a deeper depth (which hopefully is ABOVE the bottom). During normal ascent and descent rates of the SeaSoar, approx. 5-30 readings are averaged within every 4 m depth bin. At times of particularly slow depth change, more readings are included in these averages. Average latitude and longitude and date/time (GMT) for each depth bin are shown. OPC data for each reported depth bin include the total abundance of particles (no per m3), total carbon biomass (ug C/m3; estimated from equivalent spherical diameter (ESD) based on Rodriguez and Mullin (1986)), and a biomass spectrum (50 size classes of particles). The header for the biomass spectrum header (minimum of 0.33; maximum of 4.09) values are log10 based carbon intervals of individual particle size. There are 50 biomass size classes. The data for each of the spectra are the accumulated carbon of that size particle, normalized by

the water volume, then normalized by the carbon interval, then expressed as log10 units. So the unit of biomass for each spectral class is log10(biomass spectrum (1/m3)).

Note 1: A fluorometer was interfaced with the OPC only for cruise NH0005. For all other cruises, the 'fluor' field value of 0.00 means 'no data'.

Note 2: Biomass spectrum contents: Header value of 0.33 means particles of ca. 10^0.33 = 2.138 ugC per particle. Largest particle size (header value 4.09 is particles of ca. 12302 ugC per particle)

Note 3: The original data contained values of '-99.00' to represent zero counts within any particular size (according to correspondence with Dr. Meng Zhou). BCO-DMO changed the '-99.00' values to '0.00' on 16 Oct 2012 so that they are not misinterpreted.

Processing Description

BCO-DMO data manager processing notes:

16 Oct 2012: BCO-DMO re-formatted the data by converting the size class columns into rows.
BCO-DMO replaced values of '-99.00' with -0.00' (-99.00 means zero counts in that specific size) on 16 Oct 2012.

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Parameters

Parameter	Description	Units
cruiseid	Cruise ID	unitless
year	Year	unitless
transect	Transect Description	unitless
start_month_gmt	Month of Transect Start (GMT)	unitless
start_day_gmt	Day of Transect Start (GMT)	unitless
start_time_gmt	Time of Transect Start (GMT)	unitless
elptime	Elapsed time from Start Time.	hours
month_gmt	Month	unitless
day_gmt	Day	unitless
time_gmt	Time	unitless
lat	Latitude [decimal degrees]	decimal degrees
lon	Longitude [decimal degrees]	decimal degrees
depth	Depth of Observation [meters]	meters
abundance	Total Abundance [counts/m3]	counts/m3
biomass_tot	Total Biomass [ug C/m3]	microgram C/meter^3
biovol	Total Biovolume [mm3/m3]	mm3/m3
fluor	Chlorophyll [mg/m3] See Note 1 below.	mg/m3
size_class	Smallest Size Class of biomass spectrum. (See Note 2 above, under 'Processing Description'.)	
biomass	The data for each of the spectra are the accumulated carbon of that size particle, normalized by the water volume, then normalized by the carbon interval, then expressed as log10 units. So the unit of biomass for each spectral class is log10(biomass spectrum (1/m3)).	

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Instruments

Dataset-specific Instrument Name	SeaSoar
Generic Instrument Name	SeaSoar
Dataset-specific Description	We attached an Optical Plankton Counter (see Zhou and Tande, 2002) to the OSU towed body (SeaSoar) to make 3-dimensional mesoscale surveys(in a 100-km-wide coastal region from Newport, Oregon to CrescentCity, California) aimed at determining the distribution andproductivity of zooplankton in relation to their physical environment.
Generic Instrument Description	Towed, undulating vehicle usually equipped with a VPR, TAPS, PAR, CTD

Dataset-specific Instrument Name	Optical Plankton Counter
Generic Instrument Name	Optical Plankton Counter
Generic Instrument Description	An OPC provides quantitative measurements of abundance and sizes of mesozooplankton ranging between approximately 0.25 and 14 mm in Equivalent Spherical Diameter (ESD), and has the capability to integrate measurements from other sensors such as a CTD, fluorometer and Global Positioning System (GPS). It can be deployed on a variety of instruments such as SeaSoar, Aries, Scanfish, MOCNESS, a bongo net or simple towing frame. The data from an OPC are typically transmitted to a data acquisition computer through two conducting wires in a towing cable at real time, but it can also be modified to have an internal memory. Large amounts of data are produced. The procedures employed by OPC users vary from; i) estimating integrated biomass by integrating the OPC size distributions, ii) comparing size distributions between OPC and net samples, and iii) simply isolating a size region in the OPC size distribution which correspond solely to specific taxa, eg. Calanus spp.. from: Zhou, M., Tande, K., 2002. Optical Plankton Counter Workshop. GLOBEC Report 17, University of Tromso, Tromso

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Deployments

NH0005

Website	https://www.bco-dmo.org/deployment/57557
Platform	R/V New Horizon
Report	http://globec.whoi.edu/nep/reports/ccs_cruises/nh0005/nh0005cr.pdf
Start Date	2000-05-28
End Date	2000-06-13

NH0007

Website	https://www.bco-dmo.org/deployment/57558
Platform	R/V New Horizon
Report	http://globec.whoi.edu/nep/reports/ccs_cruises/nh0007/nh0007cr.pdf
Start Date	2000-07-27
End Date	2000-08-12

T0205

Website	https://www.bco-dmo.org/deployment/57595
Platform	R/V Thomas G. Thompson
Report	http://globec.whoi.edu/nep/reports/ccs_cruises/t0205cr.pdf
Start Date	2002-06-01
End Date	2002-06-17

R0208

Website	https://www.bco-dmo.org/deployment/57574
Platform	R/V Roger Revelle
Report	http://globec.whoi.edu/nep/reports/ccs_cruises/r0208cr.pdf
Start Date	2002-07-31
End Date	2002-08-19

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Project Information

U.S. GLOBEC Northeast Pacific (NEP)

Website: http://nepglobec.bco-dmo.org

Coverage: Northeast Pacific Ocean, Gulf of Alaska

Program in a Nutshell

Goal: To understand the effects of climate variability and climate change on the distribution, abundance and production of marine animals (including commercially important living marine resources) in the eastern North Pacific. To embody this understanding in diagnostic and prognostic ecosystem models, capable of capturing the ecosystem response to major climatic fluctuations.

Approach: To study the effects of past and present climate variability on the population ecology and population dynamics of marine biota and living marine resources, and to use this information as a proxy for how the ecosystems of the eastern North Pacific may respond to future global climate change. The strong temporal variability in the physical and biological signals of the NEP will be used to examine the biophysical mechanisms through which zooplankton and salmon populations respond to physical forcing and biological interactions in the coastal regions of the two gyres. Annual and interannual variability will

be studied directly through **long-term observations** and detailed **process studies**; variability at longer time scales will be examined through **retrospective analysis** of directly measured and proxy data. Coupled **biophysical models** of the ecosystems of these regions will be developed and tested using the process studies and data collected from the long-term observation programs, then further tested and improved by hindcasting selected retrospective data series.

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Program Information

U.S. GLOBal ocean ECosystems dynamics (U.S. GLOBEC)

Website: http://www.usglobec.org/

Coverage: Global

U.S. GLOBEC (GLOBal ocean ECosystems dynamics) is a research program organized by oceanographers and fisheries scientists to address the question of how global climate change may affect the abundance and production of animals in the sea.

The U.S. GLOBEC Program currently had major research efforts underway in the Georges Bank / Northwest Atlantic Region, and the Northeast Pacific (with components in the California Current and in the Coastal Gulf of Alaska). U.S. GLOBEC was a major contributor to International GLOBEC efforts in the Southern Ocean and Western Antarctic Peninsula (WAP).

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0002257
National Oceanic and Atmospheric Administration (NOAA)	unknown NEP NOAA

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