

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 |
|--------------------------------|---|------------------------|
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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.

Table of Contents

- [Coverage](#)
 - [Dataset Description](#)
 - [Methods & Sampling](#)
 - [Data Processing Description](#)
 - [Data Files](#)
 - [Parameters](#)
 - [Instruments](#)
 - [Deployments](#)
 - [Project Information](#)
 - [Program Information](#)
 - [Funding](#)
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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 displayed 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

Methods & Sampling

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.

Data 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.

[[table of contents](#) | [back to top](#)]

Data Files

| File |
|---|
| opc_ccs_alt.csv (Comma Separated Values (.csv), 2.74 GB) MD5:7d81665dfd551138ff80dce486ac95f8 |
| Primary data file for dataset ID 3744 |

[[table of contents](#) | [back to top](#)]

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/m ³] | counts/m ³ |
| biomass_tot | Total Biomass [$\mu\text{g C/m}^3$] | microgram C/meter ³ |
| biovol | Total Biovolume [mm^3/m^3] | mm^3/m^3 |
| fluor | Chlorophyll [mg/m^3] See Note 1 below. | mg/m^3 |
| 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 log ₁₀ units. So the unit of biomass for each spectral class is log ₁₀ (biomass spectrum (1/m ³)). | |

[[table of contents](#) | [back to top](#)]

Instruments

| | |
|---|--|
| 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. <i>Calanus</i> spp.. from: Zhou, M., Tande, K., 2002. Optical Plankton Counter Workshop. GLOBEC Report 17, University of Tromso, Tromso |

| | |
|---|--|
| 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 and productivity of zooplankton in relation to their physical environment. |
| Generic Instrument Description | Towed, undulating vehicle usually equipped with a VPR, TAPS, PAR, CTD |

[[table of contents](#) | [back to top](#)]

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.who.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.who.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.who.edu/nep/reports/ccs_cruises/r0208cr.pdf |
| Start Date | 2002-07-31 |
| End Date | 2002-08-19 |

[[table of contents](#) | [back to top](#)]

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.

[[table of contents](#) | [back to top](#)]

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).

[[table of contents](#) | [back to top](#)]

Funding

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

[[table of contents](#) | [back to top](#)]