

Plankton biovolume data from MOCNESS tows, 2001-2002 NBPalmer cruises NBP0103, NBP0104, NBP0202, NBP0204 from the Southern Ocean (SOGLOBEC project)

Website: <https://www.bco-dmo.org/dataset/2372>

Data Type: Cruise Results

Version: 1

Version Date: 2006-01-17

Project

» [U.S. GLOBEC Southern Ocean](#) (SOGLOBEC)

Program

» [U.S. GLOBal ocean ECosystems dynamics](#) (U.S. GLOBEC)

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Abstract

This data set is derived from displacement volume measurements and dry weight conversion calculations of plankton samples collected by a MOCNESS-1 on the RV/N.B.Palmer cruises NBP0103, NBP0104, NBP0202, NBP0204 from the Southern Ocean in austral fall/winter of 2001 and 2002.

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Coverage

Spatial Extent: N:-65.147 E:-65.529 S:-69.243 W:-75.732

Temporal Extent: 2001-04-29 - 2002-09-11

Dataset Description

Southern Ocean Biovolume Data from the MOCNESS tows during the Broadscale Cruises, Austral Autumn 2001 and 2002 NB Palmer

This data set is derived from displacement volume measurements and dry weight conversion calculations (see Methods below). The MOCNESS-1 plankton sampler has nine rectangular nets (1m x 1.4 m) with a mesh size of 0.333 mm, which are opened and closed sequentially by commands through conducting cable from the surface (Wiebe *et al.*, 1976).

Cruises:

Nathaniel B. Palmer, April-June 2001 (NBP01-03), 24 tows

Nathaniel B. Palmer, July-Sept. 2001 (NBP01-04), 17 tows

Nathaniel B. Palmer, April-May 2002 (NBP02-02), 24 tows

Nathaniel B. Palmer, July-Sept. 2002 (NBP02-04), 19 tows

Related Datasets:

- Zooplankton Biomass and Abundance from MOCNESS tows using silhouette analysis: NB Palmer, austral fall & winter of 2001 & 2002. Biomass (wet weight) and abundance were determined principally by silhouette digitization of taxa lengths and conversion to equivalent wet weights according to the equations and methods adapted from Davis and Wiebe (1985) and Wiebe *et al.* (2004). <https://www.bco-dmo.org/dataset/2389>

- Zooplankton Abundance Based on Taxa and Life Stages or Size Collected during the Broadscale Cruises, Austral Autumn 2001 and 2002, NB Palmer. These abundance values on the same tows were derived by counting and identifying a subset of the zooplankton to the species and life stage for euphausiids and dominant copepods and to taxonomic group with broad size categories for other zooplankton (pteropod, chaetognath, polychaete, etc.). <https://www.bco-dmo.org/dataset/2387>

Acquisition Description

This data set is derived from displacement volume measurements and dry weight conversion calculations. The MOCNESS-1 plankton sampler has nine rectangular nets (1m x 1.4 m) with a mesh size of 0.333 mm, which are opened and closed sequentially by commands through conducting cable from the surface (Wiebe *et al.*, 1976).

Methods:

Displacement volume measurement: The entire sample plus liquid was measured in a large graduated cylinder then poured through a sieve into a second cylinder. The difference in volume is the displacement volume.

Detailed instructions:

Measuring Displacement Volume

Supplies: rubber gloves, safety goggles, 2 1-liter graduated cylinders, 2 smaller graduated cylinders (25 to 100 ml), 2 funnels: 1 wide-necked open funnel and 1 small-necked one with mesh attached to the inside or a sieve that fits inside the small-necked funnel, squeeze bottles (water and formalin or other preservative), sieve of mesh size equal to or smaller than that on sampling net.

Put on rubber gloves

Remove jars for 1 net from sample box (may be from one to many jars for a single net sample)

Fill in the data sheet with MOC tow#, date, and net#. jar#

Take first sample to hood. Put on safety goggles.

Remove lid and internal label with long forceps. Get most of zooplankton off by dipping into jar and place label inside lid after checking that internal label agrees with lid label.

Remove large (>5cc) animals (medusae, some fish or shrimp) and measure their displacement volume in the small graduated cylinders:

-Put animal and enough liquid to cover in one small graduated cylinder.-Note this volume on data sheet.

-Place small sieve in small funnel and set them on top of second empty small grad graduated cylinder.

-Pour animal plus liquid into sieve and let drain.

-Note this volume on data sheet as well as the type of animal.

-Return the specimen to the main sample.

Pour the large sample into the 1-liter graduated cylinder using the open funnel on top (no mesh in funnel). Rinse sparingly the jar, funnel and sides of the graduated cylinder. Diluting the sample with water could cause it to rot. Add a little water with the squeeze bottle to bring the level up to an even line on the graduated cylinder.

Note this volume on the data sheet (sample + liquid)

Place the large funnel containing the sieve or mesh on top of the second, empty graduated cylinder.

Pour the sample into the empty grad. Don't worry about animals stuck to the sides of the first grad. Do not add any liquid to wash sample into the second grad.

Swirl the funnel to remove excess liquid until most of liquid is done dripping (about 1 minute, but varies sample to sample). Carefully drawing the samples toward the center with large forceps is sometimes helpful.

Note this volume on data sheet (liquid vol.)

Rinse the graduated cylinder and the mesh-funnel into the sieve with the hose and return most of the dry sample to the jar using the open funnel.

Use water from faucet with hose to wash the sample on sieve to one side and then use squirt bottle of water (sparingly) or the preservative filled one to rinse the sample from sieve

to jar.

Add enough of the filtered formalin to fill the jar, dispose of remainder in appropriate waste container.

- Check the sample's pH and add buffer (sodium borate or borax) if = 8.0.
- Replace cap, swirl if buffer or formalin was added, and rinse outside of jar.
- Rinse everything well after each net sample.

Dry weight calculations:

dry weight = $(\text{dvol}/(100.139))^{(1/1.003)}$; [mg/m³]

integrated dry weight = depth interval * dry weight; [mg/m²]

total dry weight for the entire sampled water column = sum of integrated dry weights for all nets for one tow; [mg/m²]

Processing Description

Displacement volume measurement:

Entire sample plus liquid was measured in a large graduated cylinder then poured through a sieve into a second cylinder. The difference in volume is the displacement volume.

Dry weight calculations:

dry weight = $(\text{dvol}/(10^{0.139}))^{(1/1.003)}$; [mg/m³]

integrated dry weight = depth interval * dry weight; [mg/m²]

total dry weight for the entire sampled water column = sum of integrated dry weights for all nets for one tow; [mg/m²]

This displacement volume data comes from nets with a mesh size of 333 μm .

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Related Publications

Wiebe, P. H., K.H. Burt, S. H. Boyd, A. W. Morton (1976). A multiple opening/closing net and environment sensing system for sampling zooplankton. J. Mar. Res., 34, 313-326.

Parameters

Parameter	Description	Units
cruiseid	cruise id, e.g. NBP0202, for RVIB Palmer cruise 0202	
year	year of cruise	
month_local	month of year, local time	
day_local	day of month, local time	
time_local	local time	hhmm
event	event number from cruise event log; unique ID	
station	consecutive station number, from event log	
station_std	standard station number, from event log	
region	geographic area of sampling. e.g. northeast shelf or off-shelf	
lat	latitude, negative = South	decimal degrees
lon	longitude, negative = West	decimal degrees
depth_w	depth of water at the start of tow	meters
tow	Tow number	
net	sequential MOCNESS net number	
depth_open	depth each net was opened	meters
depth_close	depth each net was closed	meters
depth_mid	mid-depth of strata sampled by net	meters
depth_interval	depth interval of strata sampled by net; water column thickness or layer	meters
vol_filt	volume filtered	m ³
displ_vol	displacement volume (biovolume) ¹	cm ³ /100m ³
displ_vol_integ	integrated displacement volume for a single net sample over depth sampled by that net	cm ³ /m ²

dry_wgt	dry weight2	mg/m3
dry_wgt_integ	integrated dry weight for a single net sample over depth sampled by that net	mg/m2
dry_wgt_total	total dry weight for the entire sampled water column	mg/m2
comments	clarification of data	

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Instruments

Dataset-specific Instrument Name	MOCNESS1
Generic Instrument Name	MOCNESS1
Dataset-specific Description	MOCNESS 1 meter square nets (150 and 335 micrometer mesh) The MOCNESS-1 plankton sampler has nine rectangular nets (1 m x 1.4 m) with a mesh size of 0.333 mm, which are opened and closed sequentially by commands through conducting cable from the surface
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. The MOCNESS-1 carries nine 1-m ² nets usually of 335 micrometer mesh and is intended for use with the macrozooplankton. All nets are black to reduce contrast with the background. A motor/toggle release assembly is mounted on the top portion of the frame and stainless steel cables with swaged fittings are used to attach the net bar to the toggle release. A stepping motor in a pressure compensated case filled with oil turns the escapement crankshaft of the toggle release which sequentially releases the nets to an open then closed position on command from the surface. -- from the MOCNESS Operations Manual (1999 + 2003).

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Deployments

NBP0103

Website	https://www.bco-dmo.org/deployment/57636
Platform	RVIB Nathaniel B. Palmer
Report	http://globec.who.edu/so-dir/reports/nbp0103/nbp0103.html
Start Date	2001-04-24
End Date	2001-06-05

NBP0104

Website	https://www.bco-dmo.org/deployment/57638
Platform	RVIB Nathaniel B. Palmer
Report	http://www.ccpo.odu.edu/Research/globec/cruises01/nbp0104_menu.html
Start Date	2001-07-22
End Date	2001-08-31

NBP0202

Website	https://www.bco-dmo.org/deployment/57641
Platform	RVIB Nathaniel B. Palmer
Report	http://globec.whoi.edu/so-dir/reports/nbp0202/nbp0202b.html
Start Date	2002-04-09
End Date	2002-05-21

NBP0204

Website	https://www.bco-dmo.org/deployment/57643
Platform	RVIB Nathaniel B. Palmer
Report	http://globec.whoi.edu/so-dir/reports/nbp0204/nbp0204b.html
Start Date	2002-07-31
Project Information	
End Date	2002-09-18

U.S. GLOBEC Southern Ocean (SOGLOBEC)

Website: http://www.ccpo.odu.edu/Research/globec_menu.html

Coverage: Southern Ocean

The fundamental objectives of United States Global Ocean Ecosystems Dynamics (U.S. GLOBEC) Program are dependent upon the cooperation of scientists from several disciplines. Physicists, biologists, and chemists must make use of data collected during U.S. GLOBEC field programs to further our understanding of the interplay of physics, biology, and chemistry. Our objectives require quantitative analysis of interdisciplinary data sets and, therefore, data must be exchanged between researchers. To extract the full scientific value, data must be made available to the scientific community on a timely basis.

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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 Antarctic Sciences (NSF ANT)	unknown SOGLOBEC NSF ANT

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