

# Mesozooplankton sample data from R/V Pelican cruises PE03-NGOMEX, PE04-NGOMEX, PE06-NGOMEX, PE07-NGOMEX, PE09-05 in the Northern Gulf of Mexico from 2003-2008

Website: <https://www.bco-dmo.org/dataset/746107>

Data Type: Cruise Results

Version: 2

Version Date: 2018-10-22

## Project

» [NGOMEX - Living Marine Resources of the Northern Gulf of Mexico](#) (GoMX - NGOMEX)

## Program

» [Gulf of Mexico - Deepwater Horizon Oil Spill](#) (GoMX - DHOS)

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## Abstract

CTD casts using a high-capacity, diaphragm pump were conducted during the R/V Pelican cruises PE03-NGOMEX, PE04-NGOMEX, PE06-NGOMEX, PE07-NGOMEX, and PE09-05 in the Northern Gulf of Mexico between 2003 and 2008. Plankton samples were collected from discrete depths during the CTD casts. Subsamples of sample contents were manually counted, identified, and measured in the laboratory. For a complete list of measurements, refer to the

supplemental document 'Field\_names.pdf', and a full dataset description is included in the supplemental file 'Dataset\_description.pdf'. The most current version of this dataset is available at: <http://www.bco-dmo.org/dataset/746107>

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## Coverage

**Spatial Extent:** N:29.6996 E:-89.47567 S:28.39068 W:-93.65449

**Temporal Extent:** 2003-07-30 - 2008-08-12

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## Dataset Description

Subsets of these data were published in the papers listed in the "Related Resources" section.

Related dataset:

\* ScanFish Optical Plankton Counter (OPC) data: <https://www.bco-dmo.org/dataset/746081>

## Acquisition Description

Methodology:

Plankton samples were collected from discrete depths during CTD casts using a high-capacity, diaphragm pump with an intake hose mounted to the CTD Rosette. Subsamples of sample contents were manually counted, identified, and measured in the laboratory

Sampling and analytical procedures:

For each sample, the pump was run for a timed period of nominally 5 min. The flow rate of the

pump was usually measured immediately prior to sampling, by recording the time required to fill a barrel of known volume. Samples were preserved and stored in 5% buffered formalin. The laboratory protocol was to separate samples into two size fractions by passing them through large (200 or 500  $\mu\text{m}$ ) then small (64  $\mu\text{m}$ ) mesh sieves; split, dilute, and sub-sample each size fraction as needed; count and identify all plankters (minimum  $n = 50$ ) in each subsample; and estimate the length and width of exactly 100 plankters (the first 50 from the large and small fraction, respectively) to the nearest 50  $\mu\text{m}$  using a dissecting microscope. Three replicate small size fractions per sample were processed starting in 2006.

Data column "vol" was calculated as follows:

$$\text{vol} = \text{length}(\text{unique}(\text{replicate}) * \text{aliquot}/\text{beaker}/2^{\text{splits}} * 50/\text{s\_per\_50l} * \text{d\_min} * 60 * 1\text{e-}3$$

Data column "flag" contains the following codes:

flag 1: length & width were not measured, but estimated from similar samples

flag 2: shallow & deep samples not labeled, but deduced from sample contents

flag 3: depth estimate less accurate than usual ( $\pm \sim 3$  m)

flag 4: time estimate less accurate than usual ( $\pm \sim 15$  min)

flag 5: pump flow rate estimated by nominal flow rate

## Processing Description

Data processing:

Nominal sampling time and depth were corrected by analysis of CTD upcast data. CTD pressure sensor measurements at depth were adjusted to compensate for non-zero readings on deck of the research vessel over the course of each cruise. Bottom depth was estimated from filtered CTD altimeter and pressure data. Longitude and latitude were taken from the vessel's MIDAS system or a separate GPS unit at the time the CTD was turned on.

Inconsistent taxonomic identifications (e.g., misspelled or misleading colloquial categories) were corrected by manually creating and automatically applying a lookup table. All data processing was performed using the R language and environment for statistical computing.

BCO-DMO Data Manager Processing Notes:

- \* added a conventional header with dataset name, PI name, version date

- \* modified parameter names to conform with BCO-DMO naming conventions

- \* added ISO Timestamp column

- \* rounded decimal places of columns. Number of decimal places provided by data contributor.

Data version 1: 2018-09-12 replaced by data version 2: 2018-10-22. Dataset was modified to use unique ctd profile identifiers and remove redundant time/date columns (y,m,d,h,m,s).

## Related Publications

Elliott, D. T., Pierson, J. J., & Roman, M. R. (2012). Relationship between environmental conditions and zooplankton community structure during summer hypoxia in the northern Gulf of Mexico. *Journal of Plankton Research*, 34(7), 602–613. doi:[10.1093/plankt/fbs029](https://doi.org/10.1093/plankt/fbs029)

Kimmel, D. G., Boicourt, W. C., Pierson, J. J., Roman, M. R., & Zhang, X. (2010). The vertical distribution and diel variability of mesozooplankton biomass, abundance and size in response to hypoxia in the northern Gulf of Mexico USA. *Journal of Plankton Research*, 32(8), 1185–1202. doi:[10.1093/plankt/fbp136](https://doi.org/10.1093/plankt/fbp136)

Pierson, J. J., Roman, M. R., Kimmel, D. G., Boicourt, W. C., & Zhang, X. (2009). Quantifying changes in the vertical distribution of mesozooplankton in response to hypoxic bottom waters. *Journal of Experimental Marine Biology and Ecology*, 381, S74–S79. doi:[10.1016/j.jembe.2009.07.013](https://doi.org/10.1016/j.jembe.2009.07.013)

Roman, M. R., Pierson, J. J., Kimmel, D. G., Boicourt, W. C., & Zhang, X. (2012). Impacts of Hypoxia on Zooplankton Spatial Distributions in the Northern Gulf of Mexico. *Estuaries and Coasts*, 35(5), 1261–1269. doi:[10.1007/s12237-012-9531-x](https://doi.org/10.1007/s12237-012-9531-x)

## Parameters

Parameter	Description	Units
ctd	CTD profile ID / start time	unitless
lon	longitude immediately preceeding CTD cast	decimal degrees
lat	latitude immediately preceeding CTD cast	decimal degrees
ISO_DateTime_UTC	Timestamp (UTC) in standard ISO 8601:2004(E) format YYYY-mm-ddTHH:MM:SSZ	unitless
d_min	sampling duration, elapsed minutes	minutes
depth	sampling depth ( $\pm$ ~1.5 m)	decibars (dbar)
bottom	bottom depth ( $\pm$ ~1.5 m)	decibars (dbar)

s_per_50l mesh	inverse of flow rate (time to pump 50 l) ( $\pm \sim 40\%$ ) sieve mesh size fraction (64 and either 200 or 500 $\mu\text{m}$ )	seconds (s) micrometers ( $\mu\text{m}$ )
splits	number of times sample was halved by plankton splitter	unitless
beaker	remaining sample volume after splits	milliliters (ml)
aliquot	volume examined under microscope	milliliters (ml)
replicate	name for replicate aliquots	unitless
vol	sample volume for in situ concentration estimates. See methodology for the formula used to calculate volume.	cubic meters ( $\text{m}^3$ )
ID	taxonomic group	unitless
length	length (to nearest 0.05 mm)	millimeters (mm)
width	width (to nearest 0.05 mm)	millimeters (mm)
adj_count	total count divided among length, width measurements	unitless
flag	flag (see methodology for flag codes)	unitless

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## Instruments

<b>Dataset-specific Instrument Name</b>	Sea-Bird 9 CTD
<b>Generic Instrument Name</b>	CTD profiler
<b>Generic</b>	The Conductivity, Temperature, Depth (CTD) unit is an integrated instrument package designed to measure the conductivity, temperature, and pressure (depth) of the water column. The instrument is lowered via cable through the water column and permits scientists observe the physical properties in real time

<b>Instrument Description</b>	via a conducting cable connecting the CTD to a deck unit and computer on the ship. The CTD is often configured with additional optional sensors including fluorometers, transmissometers and/or radiometers. It is often combined with a Rosette of water sampling bottles (e.g. Niskin, GO-FLO) for collecting discrete water samples during the cast. This instrument designation is used when specific make and model are not known.
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<b>Dataset-specific Instrument Name</b>	Ingersoll-Rand diaphragm pump
<b>Generic Instrument Name</b>	Pump
<b>Dataset-specific Description</b>	220 l/m nominal flow rate, 10 cm intake diameter opening
<b>Generic Instrument Description</b>	A pump is a device that moves fluids (liquids or gases), or sometimes slurries, by mechanical action. Pumps can be classified into three major groups according to the method they use to move the fluid: direct lift, displacement, and gravity pumps

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## Deployments

### PE03-NGOMEX

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58120">https://www.bco-dmo.org/deployment/58120</a>
<b>Platform</b>	R/V Pelican
<b>Start Date</b>	2003-06-30
<b>End Date</b>	2003-08-05
<b>Description</b>	2003 Sampling cruise to the Northern Gulf of Mexico Note: Deployment Id assigned by BCO-DMO staff (not official)

### PE04-NGOMEX

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58121">https://www.bco-dmo.org/deployment/58121</a>
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<b>Platform</b>	R/V Pelican
<b>Start Date</b>	2004-07-28
<b>End Date</b>	2004-08-02
<b>Description</b>	2004 Sampling cruise to the Northern Gulf of Mexico Note: Deployment Id assigned by BCO-DMO staff (not official)

#### PE06-NGOMEX

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58122">https://www.bco-dmo.org/deployment/58122</a>
<b>Platform</b>	R/V Pelican
<b>Start Date</b>	2006-08-04
<b>End Date</b>	2006-08-13
<b>Description</b>	2006 Sampling cruise to the Northern Gulf of Mexico Note: Deployment Id and Chief Scientist assigned by BCO-DMO staff (not official)

#### PE07-NGOMEX

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58123">https://www.bco-dmo.org/deployment/58123</a>
<b>Platform</b>	R/V Pelican
<b>Start Date</b>	2007-07-21
<b>End Date</b>	2007-08-07
<b>Description</b>	2007 Sampling cruise to the Northern Gulf of Mexico Note: Deployment Id and Chief Scientist assigned by BCO-DMO staff (not official)

#### PE09-05

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58124">https://www.bco-dmo.org/deployment/58124</a>
<b>Platform</b>	R/V Pelican
<b>Start Date</b>	2008-08-01
<b>End Date</b>	2008-08-12
	2008 Sampling cruise to the Northern Gulf of Mexico Note: Cruise ID confirmed with R2R catalog Original cruise data are available from the NSF R2R data

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## Project Information

### **NGOMEX - Living Marine Resources of the Northern Gulf of Mexico (GoMX - NGOMEX)**

**Coverage:** Northern Gulf of Mexico, 28-30N 89-94W

NGOMEX - Living Organisms of the Northern Gulf of Mexico A synthesis of data collected in the Northern Gulf of Mexico from 2003-2004, 2006-2008 and 2010 Data include: - CTD Profiles - Rosette Samples - MIDAS underway meteorological - Towed SCANFISH - Net Trawls - Zooplankton counts High-resolution mapping of the major ecosystem components of the NGOMEX by year References: Kimmel, D. G., W. C. Boicourt, J. J. Pierson, M. R. Roman, X. Zhang. 2010. The vertical distribution and diel variability of mesozooplankton biomass, abundance and size in response to hypoxia in the northern Gulf of Mexico USA. *Journal of Plankton Research* 32(8): 1185-1202. doi:10.1093/plankt/fbp136 Pierson, J. J., M. R. Roman, D. G. Kimmel, W. C. Boicourt, & X. Zhang. 2009. Quantifying changes in the vertical distribution of mesozooplankton in response to hypoxic bottom waters. *Journal of Experimental Marine Biology and Ecology* 381: S74-S79. doi.org/10.1016/j.jembe.2009.07.013 Kimmel, D. G., W. C. Boicourt, J. J. Pierson, M. R. Roman, & X. Zhang. 2009. A comparison of the mesozooplankton response to hypoxia in Chesapeake Bay and the northern Gulf of Mexico using the biomass size spectrum. *Journal of Experimental Marine Biology and Ecology* 381: S65-S73. doi.org/10.1016/j.jembe.2009.07.012 Zhang, H., S. A. Ludsin, D. M. Mason, A. T. Adamack, S. B. Brandt, X. Zhang, D. G. Kimmel, M. R. Roman, & W. C. Boicourt. 2009. Hypoxia-driven changes in the behavior and spatial distribution of pelagic fish and mesozooplankton in the northern Gulf of Mexico. *Journal of Experimental Marine Biology and Ecology*. 381: S80-91. <http://dx.doi.org/10.1016/j.jembe.2009.07.014>

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## Program Information

### **Gulf of Mexico - Deepwater Horizon Oil Spill (GoMX - DHOS)**

**Coverage:** Northern Gulf of Mexico



Grants for Rapid Response Research (RAPID) The RAPID funding mechanism is used for proposals having a severe urgency with regard to availability of, or access to data, facilities or specialized equipment, including quick-response research on natural or anthropogenic disasters and similar unanticipated events. GOM - Broader Impacts The need to understand the impact of this largest oil spill to date on ecosystems and biochemical cycling is self evident. The consequences of the disaster and accompanying clean up measures (e.g. the distribution of dispersants) need to be evaluated to guide further mediating measures and to develop and improve responses to similar disasters in the future. Would it be advantageous if such oil aggregates sink, or should it rather remain suspended? Possibly measures can be developed to enhance sinking or suspension (e.g. addition of ballast minerals) once we understand their current formation and fate. Understanding the particle dynamics following the input of large amounts of oil and dispersants into the water is a prerequisite to develop response strategies for now and in the future.

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## Funding

Funding Source	Award
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-1043261</a>
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-1043248</a>
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-1043249</a>
<a href="#">National Oceanic and Atmospheric Administration (NOAA)</a>	<a href="#">NA06NOS4780148</a>
<a href="#">National Oceanic and Atmospheric Administration (NOAA)</a>	<a href="#">NA09NOS4780198</a>
<a href="#">Gulf Research Program of the National Academies of Sciences, Engineering, and Medicine (GRP)</a>	<a href="#">NAS-GRP-2000006418</a>

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