

# VPR cast data sheets from R/V Oceanus, R/V New Horizon OC473, NH1208 in the western N. Atlantic and eastern Pacific, 2011-2012 (OAPS project)

**Website:** <https://www.bco-dmo.org/dataset/3545>

**Version:**

**Version Date:** 2011-09-27

## Project

» [Horizontal and Vertical Distribution of Thecosome Pteropods in Relation to Carbonate Chemistry in the Northwest Atlantic and Northeast Pacific](#) (OAPS)

## Programs

» [Science, Engineering and Education for Sustainability NSF-Wide Investment \(SEES\): Ocean Acidification \(formerly CRI-OA\)](#) (SEES-OA)

» [Ocean Carbon and Biogeochemistry](#) (OCB)

Contributors	Affiliation	Role
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## Dataset Description

OC473: Forty four Video Plankton Recorder (VPR) casts were made on this cruise. The data sheets contain information including date, time, station, cast number, location, raw and processed filenames, magnification, start and stop frames, and interesting observations made during the extraction of regions of interest (roi's) with special attention to krill and pteropods. A typical cast entered the water, descended to about 10 meters where it rested for several minutes while the ctd was turned on, then it was raised to the surface and lowered to depth, usually 1000 meters. Finally, it was raised to the surface. Only the descent from surface to depth was extracted. Start and stop frame numbers indicate those frames of the video where the instrument was descending, not including the initial 10 meter drop.

NH1208: 46 casts in the northern Pacific Ocean. See cruise report.

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## Data Files

File
<b>vpr_logs.csv</b> (Comma Separated Values (.csv), 222 bytes) MD5:09a1758fef22bd92613500fa12a35b5b
Primary data file for dataset ID 3545

## Parameters

Parameter	Description	Units
cruise_id	cruise identifier	

## Instruments

<b>Dataset-specific Instrument Name</b>	Video Plankton Recorder
<b>Generic Instrument Name</b>	Video Plankton Recorder
<b>Generic Instrument Description</b>	<p>The Video Plankton Recorder (VPR) is a video-microscope system used for imaging plankton and other particulate matter in the size range from a few micrometers to several centimeters. The VPR is essentially an underwater microscope. It consists of four video cameras (with magnifying optics) synchronized at 60 fields per second (fps) to a red-filtered 80 W xenon strobe (pulse duration = 1 microsecond). The current lens on each camera can be adjusted to provide a field of view between 5 mm and 10 cm. Use of higher magnification lenses is currently being explored for viewing protozoans (less than 1 micrometer resolution). The four cameras are set for concentric viewing fields so that a range of up to four magnifications can be viewed simultaneously, allowing a wide size range of plankton to be sampled. Depth of field is adjusted by the lens aperture setting, and the volume sampled in each video field ranges from about 1 ml to 1 liter, depending on lens settings. The cameras have been configured for stereoscopic viewing as well. A strobe on the other arm illuminates the imaged volume and flashes 60 times per second, producing 60 images per second of the particles and plankton in the water. The images are then saved internally on a computer hard disk and later plotted. Deployment: Most commonly, the VPR is mounted in a frame and lowered into the water from the stern of the ship. Sometimes, a CTD also is mounted next to the VPR to collect depth, temperature, and salinity information at the same time as each video image. The instrument is lowered down through the water to a maximum depth of 350 meters to generate a profile of plankton/particle abundance and taxon group along with temperature and salinity. In addition to the towed configuration for mapping plankton distributions, it is possible to deploy the VPR in a fixed position (on a mooring) for viewing plankton swimming behaviors in two or three dimensions. The VPR instrument system has been used in both configurations, and deployment on ROVs has been proposed. This definition was taken from the WHOI Ocean Instruments Web site and from a US GLOBEC Newsletter.</p>

## Deployments

OC473

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58720">https://www.bco-dmo.org/deployment/58720</a>
<b>Platform</b>	R/V Oceanus
<b>Report</b>	<a href="http://hdl.handle.net/1834/43091">http://hdl.handle.net/1834/43091</a>
<b>Start Date</b>	2011-08-07
<b>End Date</b>	2011-09-01
<b>Description</b>	<p>The primary objective of the proposed research is to quantify the distribution, abundance, species composition, shell condition, and vertical migratory behavior of oceanic thecosome pteropods in the northwest Atlantic and northeast Pacific, and correlate these quantities to hydrography and concurrent measurements of carbonate chemistry, including vertical and horizontal distributions of aragonite saturation. During OC473, the first cruise in the Atlantic, a combination of underway data collection and station activities will be conducted along a transect spanning 15 degrees of latitude (35° to 50° N) in the northwest Atlantic, employing six instrument packages: (1) a 1-m<sup>2</sup> MOCNESS plankton net system; (2) a profiling Video Plankton Recorder / CTD package, including bottles for water sampling; (3) a deep (500m) towed broadband acoustic scattering system ; (4) a hull-mounted narrowband multi-frequency acoustic scattering system. It is possible that the hull mounted transducers will suffer from noise when the vessel is underway and so as a backup we will have a surface-towed sled with a backup complement of transducers; 5) an underway multi-parameter inorganic carbon analyzer and 6) a suite of chemistry-related instruments including a DIC auto-analyzer for discrete bottle sample analysis, an alkalinity auto-titrator for bottle analysis and an Agilent spectrophotometer for discrete pH measurement. Supporting documentation: Cruise track image Cruise information and original data are available from the NSF R2R data catalog.</p>

## NH1208

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58830">https://www.bco-dmo.org/deployment/58830</a>
<b>Platform</b>	R/V New Horizon
<b>Report</b>	<a href="http://hdl.handle.net/1834/43090">http://hdl.handle.net/1834/43090</a>
<b>Start Date</b>	2012-08-09
<b>End Date</b>	2012-09-18
<b>Description</b>	<p>The primary objective of this cruise was to quantify the distribution, abundance, species composition, shell condition, and vertical migratory behavior of oceanic thecosome pteropods in the northeast Pacific, and correlate these quantities to concurrent measurements of carbonate chemistry. Underway data collection and station activities were conducted on a transect running between 35 and 50N along CLIVAR line P17N. Six instrument types were used: (1) a 1-m<sup>2</sup> MOCNESS plankton net system and a 1-m diameter Reeve net; (2) a profiling Video Plankton Recorder mounted on the CTD package that includes a Rosette system with Niskin bottles for water sampling; (3) a deep (500 meter) towed broadband acoustic scattering system; (4) a surface narrowband multi-frequency acoustic scattering system; (5) an underway multi-parameter inorganic carbon analyzer and a GO underway pCO<sub>2</sub> system; and (6) a suite of chemistry-related lab instruments for bottle sample analysis including a DIC auto-analyzer, an alkalinity auto-titrator, and an Agilent spectrophotometer for pH measurement. The R/V New Horizon departed from Newport OR, and set a course for the transect start point at 50N 150W. Following instrument package test deployments over the continental shelf, the transect ran in a single zig-zag between the start point and the end at 35N 135W; a total of 34 stations were sampled along the transect, every 1/2 degree of latitude. In addition 10 other stations were sampled with a Reeve net for live experimental pteropods. The science party, divided into biology and chemistry teams conducted 24-hour operations. Cruise information and original data are available from the NSF R2R data catalog.</p>

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## Project Information

## **Horizontal and Vertical Distribution of Thecosome Pteropods in Relation to Carbonate Chemistry in the Northwest Atlantic and Northeast Pacific (OAPS)**

**Coverage:** 35 and 50 degrees North in the northwest Atlantic and northeast Pacific

Modified version of the NSF award abstract:

The impact of ocean acidification on marine ecosystems represents a vital question facing both marine scientists and managers of ocean resources. Thecosome pteropods are a group of calcareous planktonic molluscs widely distributed in coastal and open ocean pelagic ecosystems of the world's oceans. These animals secrete an aragonite shell, and thus are highly sensitive to ocean acidification due to the water column's changing carbonate chemistry, and particularly the shoaling of the aragonite compensation depth at which seawater becomes corrosive to aragonite. In many regions, however, relatively little is known about the abundance, distribution, vertical migratory behavior, and ecological importance of pteropods. Assessing the likely ecosystem consequences of changes in pteropod dynamics resulting from ocean acidification will require a detailed understanding of pteropod distribution and abundance relative to changing aragonite saturation in the water column.

The primary objective of this project is to quantify the distribution, abundance, species composition, shell condition, and vertical migratory behavior of oceanic thecosome pteropods in the northwest Atlantic and northeast Pacific, and correlate these quantities to hydrography and concurrent measurements of carbonate chemistry, including vertical and horizontal distributions of aragonite saturation. In particular, the project will capitalize on present-day variability in the depth distribution of aragonite saturation levels within and between the Atlantic and Pacific Oceans as a "natural experiment" to address the hypotheses that pteropod vertical distribution, species composition, and abundance vary as the compensation depth becomes shallower. Secondary objectives are to develop acoustic protocols for the remote quantification of pteropod abundance for future integration into ocean acidification monitoring networks, and to characterize carbonate chemistry and nutrients along portions of two WOCE/CLIVAR Repeat Hydrography transects (A20 in the Atlantic and P17N in the Pacific) to identify decadal-scale changes in the carbonate system. These hypotheses and objectives will be addressed through two cruises along survey transects between 35 and 50 degrees North in the northwest Atlantic and northeast Pacific involving a combination of station-work and underway measurements, and a comprehensive array of instruments, including acoustic, optical, towed net, hydrographic, and carbonate chemistry sensors and sampling systems.

This highly inter-disciplinary project, combines expertise in zooplankton ecology, acoustics, and marine chemistry. The proposed work will result in a detailed baseline understanding of variability in the horizontal and vertical distribution, as well as species composition, of thecosome pteropods in the northwest Atlantic and northeast Pacific, making a key contribution to zooplankton ecology generally. In addition, by quantifying the response to current spatial variability within and between the Atlantic and Pacific Oceans, the project will provide important information on the likely response of pteropod distribution to future changes in the vertical distribution of aragonite saturation levels, a necessary component in modeling the impacts of ocean acidification on marine ecosystem function, services, and resources.

Ocean acidification is increasingly appreciated as an urgent societal concern. Thecosome pteropods are key prey for a variety of commercially-exploited fish species, and the improved understanding the PIs seek of pteropod distribution and likely response to changing water column carbonate chemistry will have important implications for our understanding of potential effects of ocean acidification on marine resources.

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### **Program Information**

**Science, Engineering and Education for Sustainability NSF-Wide Investment (SEES): Ocean Acidification (formerly CRI-OA) (SEES-OA)**

**Website:** [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=503477](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503477)

**Coverage:** global

NSF Climate Research Investment (CRI) activities that were initiated in 2010 are now included under Science, Engineering and Education for Sustainability NSF-Wide Investment (SEES). SEES is a portfolio of activities that highlights NSF's unique role in helping society address the challenge(s) of achieving sustainability. Detailed information about the SEES program is available from NSF ([https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=504707](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504707)).

In recognition of the need for basic research concerning the nature, extent and impact of ocean acidification on oceanic environments in the past, present and future, the goal of the SEES: OA program is to understand (a) the chemistry and physical chemistry of ocean acidification; (b) how ocean acidification interacts with processes at the organismal level; and (c) how the earth system history informs our understanding of the effects of ocean acidification on the present day and future ocean.

**Solicitations issued under this program:**

[NSF 10-530](#), FY 2010-FY2011

[NSF 12-500](#), FY 2012

[NSF 12-600](#), FY 2013

[NSF 13-586](#), FY 2014

NSF 13-586 was the final solicitation that will be released for this program.

**PI Meetings:**

[1st U.S. Ocean Acidification PI Meeting](#) (March 22-24, 2011, Woods Hole, MA)

[2nd U.S. Ocean Acidification PI Meeting](#) (Sept. 18-20, 2013, Washington, DC)

[3rd U.S. Ocean Acidification PI Meeting](#) (June 9-11, 2015, Woods Hole, MA – Tentative)

**NSF media releases for the Ocean Acidification Program:**

[Press Release 10-186 NSF Awards Grants to Study Effects of Ocean Acidification](#)

[Discovery Blue Mussels "Hang On" Along Rocky Shores: For How Long?](#)

[Discovery nsf.gov - National Science Foundation \(NSF\) Discoveries - Trouble in Paradise: Ocean Acidification This Way Comes - US National Science Foundation \(NSF\)](#)

[Press Release 12-179 nsf.gov - National Science Foundation \(NSF\) News - Ocean Acidification: Finding New Answers Through National Science Foundation Research Grants - US National Science Foundation \(NSF\)](#)

[Press Release 13-102 World Oceans Month Brings Mixed News for Oysters](#)

[Press Release 13-108 nsf.gov - National Science Foundation \(NSF\) News - Natural Underwater Springs Show How Coral Reefs Respond to Ocean Acidification - US National Science Foundation \(NSF\)](#)

[Press Release 13-148 Ocean acidification: Making new discoveries through National Science Foundation research grants](#)

[Press Release 13-148 - Video nsf.gov - News - Video - NSF Ocean Sciences Division Director David Conover answers questions about ocean acidification. - US National Science Foundation \(NSF\)](#)

[Press Release 14-010 nsf.gov - National Science Foundation \(NSF\) News - Palau's coral reefs surprisingly resistant to ocean acidification - US National Science Foundation \(NSF\)](#)

[Press Release 14-116 nsf.gov - National Science Foundation \(NSF\) News - Ocean Acidification: NSF awards \\$11.4 million in new grants to study effects on marine ecosystems - US National Science Foundation \(NSF\)](#)

**Ocean Carbon and Biogeochemistry (OCB)**

**Website:** <http://us-ocb.org/>

**Coverage:** Global

The Ocean Carbon and Biogeochemistry (OCB) program focuses on the ocean's role as a component of the global Earth system, bringing together research in geochemistry, ocean physics, and ecology that inform on and advance our understanding of ocean biogeochemistry. The overall program goals are to promote, plan, and coordinate collaborative, multidisciplinary research opportunities within the U.S. research community and with international partners. Important OCB-related activities currently include: the Ocean Carbon and Climate Change (OCCC) and the North American Carbon Program (NACP); U.S. contributions to IMBER, SOLAS, CARBOOCEAN; and numerous U.S. single-investigator and medium-size research projects funded by U.S. federal agencies including NASA, NOAA, and NSF.

The scientific mission of OCB is to study the evolving role of the ocean in the global carbon cycle, in the face of environmental variability and change through studies of marine biogeochemical cycles and associated ecosystems.

The overarching OCB science themes include improved understanding and prediction of: 1) oceanic uptake and release of atmospheric CO<sub>2</sub> and other greenhouse gases and 2) environmental sensitivities of biogeochemical cycles, marine ecosystems, and interactions between the two.

The OCB Research Priorities (updated January 2012) include: ocean acidification; terrestrial/coastal carbon fluxes and exchanges; climate sensitivities of and change in ecosystem structure and associated impacts on biogeochemical cycles; mesopelagic ecological and biogeochemical interactions; benthic-pelagic feedbacks on biogeochemical cycles; ocean carbon uptake and storage; and expanding low-oxygen conditions in the coastal and open oceans.

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## Funding

Funding Source	Award
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-1041068</a>

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