MOCNESS CTD data from the Gulf of Maine collected on R/V Endeavor and R/V Connecticut from July to November 2010 (Krill GoME project)

Website: https://www.bco-dmo.org/dataset/3628
Version: 20120229
Version Date: 2012-02-29

Project
» Biological and Physical Determinants of Euphausiid Aggregation, Behavior, and Interaction with Higher Predators at an Abrupt Topographical Feature in the Gulf of Maine (Krill GoME)

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Dataset Description

CTD data collected during the 1 meter2 MOCNESS tows for three cruises in 2010 to the Gulf of Maine and Georges Bank. These data provide standard environmental measurements simultaneously with the collection of the animals.

Fluorescence, oxygen and irradiance data were not collected on these cruises.

Methods & Sampling

From the MOCNESS Operating Instruction Manual: "The nets are opened and closed sequentially by commands through a single conductor armored cable from the surface. The electronics has 16-bits of resolution and the basic data stream consists of temperature, depth, conductivity, frame angle, flow counts, net number and net response. An acquisition/controller computer retrieves data from the underwater unit at a rate of up to 4 times a second. Temperature (to approximately 0.01 deg C) and conductivity are measured with SEABIRD sensors. A modified T.S.K. flowmeter is normally used to measure flow past the net. Both the temperature and salinity sensors and the flowmeter are attached to brackets which are mounted on the top portion of the frame so that they face directly into the flow when the frame is at a towing angle of 45 deg. An electronic pendulum angle transducer measures the angle of the towed net through the water. A GPS unit providing latitude and longitude [is] integrated into the data stream." (p. 7)

Data Processing Description

To continue from the MOCNESS Manual: " A microcomputer (together with disk drive and printer) are the deck

unit and permit shipboard real-time data acquisition and processing as well as net control. Salinity (to approximately 0.01 ppt), net oblique velocity and vertical velocity, and volume filtered by each net is calculated after each string of data has been received by the computer. Raw and processed data are stored on disc (in separate files) and processed data can be printed out. Plots of net depth versus time, temperature and salinity versus depth, temperature versus salinity and latitude versus longitude are made during a tow and displayed on the computer screen." (p. 7)

See data objects mocness_tabs and mocness_logs for explicit processing information for each tow.

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Data Files

File	
ctd_mocness_conf.csv	(Comma Separated Values (.csv), 4.07 MB) MD5:2feb79ad8d4037f22c96f8f117c6af9b Primary data file for dataset ID 3628
ctd_mocness_conf_CT2010.csv	(Comma Separated Values (.csv), 2.32 MB) MD5:b6397d7e71fc64e1be10d6e5f5010126 Displayed by /data/Scripts/ctd_mocness/mocpro_level1_conf.pl Version: V2.1/Nov. 7, 2012 For MOC.25 data, with filetype=pro
ctd_mocness_conf_EN484.csv	(Comma Separated Values (.csv), 756.13 KB) MD5:913ffa90d0d02d15eed7adefa6ce5fb7 Displayed by /data/Scripts/ctd_mocness/mocpro_level1_conf.pl Version: V2.1/Nov. 7, 2012 For MOC.25 data, with filetype=pro
ctd_mocness_conf_EN487.csv	(Comma Separated Values (.csv), 1.00 MB) MD5:3b90e2e473671593f71ce30bf2b3b0ef Displayed by /data/Scripts/ctd_mocness/mocpro_level1_conf.pl Version: V2.1/Nov. 7, 2012 For MOC.25 data, with filetype=pro

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Parameters

Parameter	Description	Units
cruiseid	cruise identification, e.g. NBP0202, for RVIB Palmer cruise 0202	
temp	temperature of water	degrees C
datatype	sampling method - instrument type, e.g. MOCNESS-1 or MOCNESS-10	
year	year	
tow	tow number	

day_local	day of month, local, 1-31	
month_local	month of year, local, 1 - 12	
station	station number, from event log	
yrday_local	year day as a decimal, based on Julian calendar, local	YYY.Y
time_local	time, local, using 24 hour clock to decimal minutes	HHmm.m
press	depth of observation or sample	meters
potemp	potential temperature or theta[1] [1]Fofonoff and Millard, 1983, UNESCO technical papers in Marine Sciences, #44	
sal	salinity calculated from conductivity, bad values are set to 50	
sigma_0	potential density[1] [1]Fofonoff and Millard, 1983, UNESCO technical papers in Marine Sciences, #44	
angle	angle of net frame relative to vertical (0-89 degrees)	degrees
flow	consecutive flow counts	
hzvel	horizontal net velocity	m/min
vtvel	vertical net velocity	m/min
vol_filt	volume filtered	meters³
net	MOCNESS net number, (00-08)	
lat	latitude, negative = South	DD.D
lon	longitude, negative = West	DDD.D

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Instruments

Dataset-specific Instrument Name	CTD MOCNESS
Generic Instrument Name	CTD MOCNESS
Generic Instrument Description	The CTD part of the MOCNESS includes 1) a pressure (depth) sensor which is a thermally isolated titanium strain gauge with a standard range of 0-5000 decibars full scale, 2) A Sea Bird temperature sensor whose frequency output is measured and sent to the surface for logging and conversion to temperature by the software in the MOCNESS computer (The system allows better than 1 milli-degree resolution at 10 Hz sampling rate), and 3) A Sea Bird conductivity sensor whose output frequency is measured and sent to the surface for logging and conversion to conductivity by the software in the computer (The system allows better than 1 micro mho/cm at 10 Hz sampling rate). The data rate depends on the speed of the computer and the quality of the cable. With a good cable, the system can operate at 2400 baud, sampling all variables at 2 times per second. One sample every 4 seconds is the default, although the hardware can operate much faster. (From The MOCNESS Manual)

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Deployments

EN487

Website	https://www.bco-dmo.org/deployment/58141
Platform	R/V Endeavor
Report	http://bcodata.whoi.edu/Krill_GoME/EN487_Cruise_Report_FINAL.pdf
Start Date	2010-10-27
End Date	2010-11-06
Description	Cruise EN487, Chief Scientist Gareth Lawson's October-November 2010 Krill cruise to the northern flank of Georges Bank and the southern portion of the Gulf of Maine region (42 North 67.5 West), is the second of two cruises completed for the Gulf of Maine Krill project in Fall 2010. The cruises were designed to conduct the same work in the same study location. The timing of the cruises was selected to allow an examination of the impact of herring predation on euphausiid aggregations. The first cruise (cruise EN484 in 2010) each year (two similar cruises are planned for 2011) is timed to begin one week after the NOAA Ship Delaware II will have commenced its herring survey. Real-time data collected during that survey will be used to define the exact survey grid for our project. During the first cruise, EN484, the herring were expected to be pre-spawning and therefore not feeding on euphausiids (the target species for this project). The second cruise each year (EN487 in 2010) is timed to begin in the last week of October. At this time, herring and euphausiids will still be present in the study region, but the herring will be post-spawning and will have resumed feeding on euphausiids. EN487 cruise track JPEG image from URI (vessel operator) Cruise information and original data are available from the NSF R2R data catalog. **Methods & Sampling** Both the VPR and MOCNESS were deployed via the stern A-frame using winch #2. Although the VPR is autonomous and does not require conducting cable, for this cruise we had borrowed Dr. Mark Baumgartner's VPR, which includes a full CTD. We therefore wired up this CTD through the winch in order to get real-time information on depth and altitude, and to use (or try to use) Mark's bottom switch. This required some initial fiddling with baudrate and sampling intervals, but communication worked fine. The MOCNESS communicated with the deck unit fine with the ca. 10,000m of wire on winch #2.

EN484

Website	https://www.bco-dmo.org/deployment/58140
Platform	R/V Endeavor
Report	http://bcodata.whoi.edu/Krill_GoME/EN484_Cruise_Report_FINAL.pdf
Start Date	2010-09-22
End Date	2010-09-30
Description	Cruise EN484, Chief Scientist Gareth Lawson's September 2010 Krill cruise to the northern flank of Georges Bank and the southern portion of the Gulf of Maine region (42 North 67.5 West), is the first of two cruises in Fall 2010 doing the same work in the same study location. The cruise was scheduled to allow an examination of the impact of herring predation on euphausiid aggregations. The first cruise each year (two similar cruises are planned for 2011) is timed to begin one week after the NOAA Ship Delaware II will have commenced its herring survey. Real-time data collected during that survey will be used to define the exact survey grid for our project. During EN484, the first 2010 cruise, the herring were expected to be pre-spawning and therefore not feeding on euphausiids (the target species for this project). The second cruise each year is timed to begin in the last week of October (EN487 in 2010). At this time, herring and euphausiids will still be present in the study region, but the herring will be post-spawning and will have resumed feeding on euphausiids. Cruise information and original data are available from the NSF R2R data catalog. **Methods & Sampling** A standard 1m2 Multiple Opening/Closing Net and Environmental Sensing System (MOCNESS) was used to collect zooplankton in order to determine the taxonomic composition of the zooplankton in the study region and also to ground truth acoustic data collected with the HTI multi-frequency and Edgetech broadband systems. The underwater unit used was #169. In addition to the standard temperature and conductivity probes the system also had a beta-type strobelight unit for reducing avoidance of the nets by some zooplankton, notably krill, and possibly small fish. Both the VPR and MOCNESS were deployed via the stern A-frame using winch #2. The VPR is autonomous and did not require conducting cable. The MOCNESS communicated with the deck unit fine with the ca. 10,000m of wire on winch #2.

CT2010

Website	https://www.bco-dmo.org/deployment/58661
Platform	R/V Connecticut
Start Date	2010-07-08
End Date	2010-07-16
Description	The CT2010 cruise was supported by funds from Woods Hole Sea Grant, and field work was done on the southern New England Shelf and in nearby slope waters. This is a different study area from the sites visited by the other Krill project cruises that sampled in the Gulf of Maine.

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Project Information

Biological and Physical Determinants of Euphausiid Aggregation, Behavior, and Interaction with Higher Predators at an Abrupt Topographical Feature in the Gulf of Maine (Krill GoME)

Coverage: Gulf of Maine; Georges Bank

from the NSF award abstract:

Distribution, Aggregation, and Ecological Importance of Euphausids in the Gulf

of Maine Region

Zooplankton are key members of marine ecosystems, but the biological and physical factors governing their distribution and aggregation are not fully understood, especially at the continental shelf break and margins of the deep basins of the shelf. Euphausiids are an important group of crustacean zooplankton in North Atlantic pelagic food webs and represent an interesting model species for the study of zooplankton aggregation due to their strong swimming capabilities and active aggregative behaviors. This project will address the hypotheses that the formation and variability of euphausiid aggregations along the northern flank of Georges Bank and the southern portion of the Gulf of Maine during fall relate to the interaction of physical concentration mechanisms with local topography and with plasticity in diel vertical migration and active aggregative behaviors, and that this plasticity arises from variability in food availability and predation by herring. These hypotheses will be addressed through a field program employing a comprehensive array of sensors, including both conventional narrowband and recently-developed broadband acoustic systems to sample the euphausiids, and a variety of other acoustic, optical, net, and other sampling devices to quantify their physical and biological environment. These sensors will be used in an inventive combination of (1) coarse-scale grid surveys to characterize along- and across-slope variability in the distribution of euphausiids, their predators, other zooplankton, phytoplankton, and physical conditions (e.g., the flow field), and (2) fine-scale adaptive surveys used to track individual euphausiid aggregations and observe how their three-dimensional structure and vertical position vary with changing environmental conditions. Repeat surveys will be timed to capitalize on known or likely variations in the flow field, food availability, light levels, and predation.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0928801

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