Gulf Stream Warm-Core Rings stratified euphausiid abundance and zooplankton biomass from multiple cruises in the Slope Water, Slope Water and Gulf Stream from 1981-1986 (NAtlDarkData project)

Website: https://www.bco-dmo.org/dataset/620022
Version: working
Version Date: 2015-11-13

Project
» North Atlantic Dark Data: Rings (NAtlDarkData)

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Coverage

Spatial Extent: **N**:41.137 **E**:-63.352 **S**:36.027 **W**:-74.29
Temporal Extent: 1981-04-29 - 1986-05-31

Dataset Description

This dataset is the one of several from this project being discovered and rescued and made available on line.

These data are zooplankton, specifically euphausiids, collected and identified in the 1980s as part of the warm-core rings multidisciplinary programs. Included are stratified euphausiid species abundance and zooplankton biomass from 100 MOCNESS tows and related metadata taken on 18 research cruises in the Northwest Atlantic. The euphausiid abundance numbers represent numbers per cubic meter in that depth layer. MOCNESS (Multiple Opening and Closing Nets and Environmental Sensing Systems) tows were quantified using flow meters calibrated to provide volumes of water filtered for each tow.

A note about 'nd': Traditionally 'nd' is taken to mean 'no data'. Within that meaning, however, there is much variability. Here 'nd' could mean the more traditional 'we tried and got bad or no data'. It could mean 'these data are not considered relevant to the overall effort'. Finally, 'nd' could mean 'does not exist'.

Methods & Sampling

The original acquisition and processing of these data was documented in cruise reports and peer-reviewed papers:
Hunt, M. and P.H. Wiebe (l980)
Joyce, T.M., and Wiebe, P.H. (1983)
McGowan, J. A., and Brown, D. M. (1966)
Wiebe, P.H., N.J. Copley, and S.H. Boyd (1992)

Data Processing Description

Recovering these data started with the metadata: how, when and where the zooplankton data were collected. The metadata being sought are summarized in Table 1. As noted above, the data reside in notebooks , cruise reports, old computer files, and blue cover reports.
However, the crucial element that makes the effort possible is the presence of the scientist who conducted the research for which the samples were collected and remembers many important details about where to look and what to look for. At one time some of the data were entered into a main-frame based database system, which has since disappeared (Hunt and Wiebe, [12]).

The search began systematically with the listing of all of the cruises that were participated on in the 1970s and 1980s, and then seeking out the information/data listing the zooplankton net tows. All of the data included cruise ids, station information, tow information, net descriptions rudimentary or otherwise, latitudes and longitudes, times and instrument depths, often including multiple sampling depths with the same net system.

Information was not often complete in the analysis notebooks and this required going back into the original cruise log books and crosschecking with other published papers.

For some cruises there was a personal log that had information to fill in the blanks.
There were also errors. The most potentially damaging errors were those of station position. Degrees and decimal minutes were sometimes converted to decimal degrees by simply moving the decimal place and not first dividing the minutes by 60. In addition, sometimes a discrepancy was found between the same information in two different sources. Those errors had to be tracked down using as many other sources as possible.

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Data Files

File
stratified_zoo_rs.csv (Comma Separated Values (.csv), 317.59 KB) MD5:555e2d25c85b582c512f7b7826f5bc0b Primary data file for dataset ID 620022

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Related Publications

Hunt, Mary M., & Wiebe, Peter. (1980). A database for zooplankton net tow data. W.H.O.I. Technical Report 80-28. 65 pp. doi:10.1575/1912/9574
Methods

Joyce, T.M., & Wiebe, P.H. (1983). Warm core rings of the Gulf Stream. Oceanus, 26(2), 34-44.
Methods

McGowan, J. A., & Brown, D. M. (1966). A new opening-closing paired zooplankton net (No. SIO Ref-66-23). SCRIPPS INSTITUTION OF OCEANOGRAPHY LA JOLLA CALIF. Reference 66/23, 1–56.
Methods

Wiebe, P. H., Copley, N. J., & Boyd, S. H. (1992). Coarse-scale horizontal patchiness and vertical migration of zooplankton in Gulf Stream warm-core ring 82-H. Deep Sea Research Part A. Oceanographic Research Papers, 39, S247–S278. doi:10.1016/s0198-0149(11)80015-4 https://doi.org/10.1016/S0198-0149(11)80015-4
Results

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Parameters

Parameter	Description	Units
cruiseid	unique identifier for cruise	text

year	year	YYYY
tow	sequential number of tow	number
tow_type	which instrument was used	text
net	in a multi-net system - which net was used	number
month_local	month of year	mm
day_local	day of year	dd
time_local	local time of zooplankton collection	hhmm
ISODateTime_local	ISO 19115-2 Standard Date and time	formidable format
lat	latitude of tow. North is positive	decimal degrees
lon	longitude of tow. West is negative	decimal degrees
region	location on the Earth specific to the rings	text
depth_max	maximum depth of tow	meters
depth_int	depth interval fished by net	meters
depth_mid	middle depth of tow	meters
depth_low	deepest depth fished by the particular net	meters
vol_filt	volume filtered; i.e. how much water flows through the net	cubic meters
disp_vol	displacement volume; i.e.volume of animals caught in the net; measured with a graduated cylinder	milliliters
disp_vol_Mm3	displacement volume per thousand cubic meters	cubic centimeters per 1000 cubic meters
cum_pcnt	displacement volume per thousand cubic meters over water column cumulated for individual depth strata	percent
integ_disp_vol	displacement volume per cubic meter multiplied times the depth over which the net fished	cubic centimeters per square meter

Carbon	Carbon	micromoles per kilogram
C_mM_m2	Integrated Carbon	millimoles per square meter
species	individual species names - a binomial	text
abundance	number of animals caught per cubic meters	number

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Instruments

Dataset-specific Instrument Name	MOC1D
Generic Instrument Name	MOCNESS-1D
Generic Instrument Description	The Double MOCNESS 1D carries 20 1m2 nets usually of mesh size 335micron and is designed to collect macrozooplankton. This MOCNESS system uses the same underwater and shipboard electronic system for operation and data acquisition as other MOCNESS systems. The nets are opened and closed sequentially by commands transmitted from the surface deck unit through a single conducting cable to the underwater unit. The command circuit has a provision to permit commands to be sent to either the left of right set of nets when using the double MOCNESS-1D. - from Wiebe et al, 1985.

Dataset-specific Instrument Name	MOC1
Generic Instrument Name	MOCNESS1
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-m2 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

SH-001

Website	https://www.bco-dmo.org/deployment/542007
Platform	F/V Super Horse
Start Date	1981-04-29
End Date	1981-04-29
Description	This fishing vessel was used as a ship of opportunity and went to one station to tow for zooplankton.

SH-002

Website	https://www.bco-dmo.org/deployment/542010
Platform	F/V Super Horse
Start Date	1981-05-12
End Date	1981-05-12
Description	This fishing vessel was used as a ship-of-opportunity to occupy stations as part of the Rings Projects. Only one location is recorded.

SH-003

Website	https://www.bco-dmo.org/deployment/542016
Platform	F/V Super Horse
Start Date	1981-06-29
End Date	1981-06-29
Description	This was a ship of opportunity for the Rings Project and only one station was recorded. This is the location of a zooplankton tow.

SH-004

Website	https://www.bco-dmo.org/deployment/542019
Platform	F/V Super Horse
Start Date	1981-07-28
End Date	1981-07-28
Description	This is the only location reported for this cruise. It was a ship of opportunity used to facilitate the collection of zooplankton as part of the Rings Projects.

SH-005

Website	https://www.bco-dmo.org/deployment/542022
Platform	F/V Super Horse
Start Date	1981-08-19
End Date	1981-08-19
Description	This is the only position for this cruise. This was a ship of opportunity to enable zooplankton collection in a Gulf Stream Ring.

OC98

Website	https://www.bco-dmo.org/deployment/542013
Platform	R/V Oceanus
Start Date	1981-05-29
End Date	1981-05-29
Description	This is the only location recorded for this cruise. It is the location of a MOCNESS tow and is part of the Rings Projects.

AII-110

Website	https://www.bco-dmo.org/deployment/542025
Platform	R/V Atlantis II
Start Date	1981-09-21
End Date	1981-10-05
Description	These positions are only a portion of the cruise track. They represent the station locations where zooplankton tows were done and are the only positions we have at the present time for the cruise. More station positions will be added to the track as time permits. All the locations are found in the data.

OC106

Website	https://www.bco-dmo.org/deployment/542030
Platform	R/V Oceanus
Start Date	1981-10-27
End Date	1981-10-27
Description	This position is the only one for this cruise. If other positions become known, they will be added. This is the position of a zooplankton tow during one of the Rings Project cruises.

OC109

Website	https://www.bco-dmo.org/deployment/542033
Platform	R/V Oceanus
Start Date	1981-11-23
End Date	1981-11-23
Description	This deployment has only one known point at this time. When more locations become available, they will be added. This point represents a zooplankton tow which was a part of the Rings Projects.

OC111

Website	https://www.bco-dmo.org/deployment/542035
Platform	R/V Oceanus
Start Date	1981-12-11
End Date	1981-12-13
Description	This is not really the entire cruise track. Instead, these are the two positions of zooplankton tows taken during this cruise and the only representation of the cruise track that we have at the moment. When more locations become available, we will add them.

OC112

Website	https://www.bco-dmo.org/deployment/542058
Platform	R/V Oceanus
Start Date	1982-01-05
End Date	1982-01-05
Description	This is the only position we have for this cruise at the present time. When and if more locations become available, we will add them to the ship's track. This was the location of a zooplankton tow that was part of the Rings Projects.

OC114

Website	https://www.bco-dmo.org/deployment/542074
Platform	R/V Oceanus
Start Date	1982-02-08
End Date	1982-02-08
Description	This is the only position we have for this cruise at this time. It represents one of the stations where a net tow was made for zooplankton as part of the Rings Projects.

OC116

Website	https://www.bco-dmo.org/deployment/542078
Platform	R/V Oceanus
Start Date	1982-03-11
End Date	1982-03-15
Description	These positions are the only cruise track positions that we currently have. These represent stations where zooplankton tows were done as part of the Rings Projects. If and when more locations become available, they will be added as time permits.

OC118

Website	https://www.bco-dmo.org/deployment/542082
Platform	R/V Oceanus
Start Date	1982-04-19
End Date	1982-05-02
Description	These locations are not the real ship's track. They represent only those locations where zooplankton tows were made. If and when more cruise track locations become available, they will be added as time allows.

OC121

Website	https://www.bco-dmo.org/deployment/542086
Platform	R/V Oceanus
Start Date	1982-06-16
End Date	1982-06-29
Description	These locations only represent a portion of the ship's track. These positions are where tows were done to collect zooplankton as part of the Rings Projects. As more ship's track locations become available, they will be added as time permits. **Methods & Sampling** Tows 183 and 184 were tow-yos through the Warm Core Ring center. The depths fished were 0-100-0-100 continuing. There would be no cumulative percents recorded because there was no accumulation. The whole towed water column was sampled with each tow-yo.

OC125

Website	https://www.bco-dmo.org/deployment/542090
Platform	R/V Oceanus
Start Date	1982-08-10
End Date	1982-08-22

KN122

Website	https://www.bco-dmo.org/deployment/542098
Platform	R/V Knorr
Report	http://dmoserv3.bco-dmo.org/data_docs/NAtlDarkData/KN122_INSTRUMENT_TESTING_CRUISE_TO_SLOPE_WATER_AND_WARM-CORE_RING_86A.pdf
Start Date	1986-05-29
End Date	1986-05-31
Description	These positions represent only a portion of the total ship's track. These positions represent stations where zooplankton tows were made as part of the Rings Projects. As more location data become available, they will be added as time permits.

KN98

Website	https://www.bco-dmo.org/deployment/542094
Platform	R/V Knorr
Start Date	1982-09-27
End Date	1982-10-16
Description	These locations represent only a portion of the ship's track. They are the locations of zooplankton tows taken during the Rings Project. When more locations become available, they will be added as time permits.

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Project Information

North Atlantic Dark Data: Rings (NAtlDarkData)

Coverage: North Atlantic, Sargasso Sea, NW Atlantic Slope Water

Recent changes in NSF and other agency data policies (NSF11060, 2011; OSTP memo 2013) mandating timely and open access to data and information generated in the course of US funded research have resulted in a relatively rapid change in the culture of data sharing. Technological advances, policy changes, and increased awareness of the need for and benefits of well-curated data make it much more likely that recently generated research results will be made publicly available and in a timely manner. However, many scientific data were generated at a time when the technology for curation, storage, and dissemination were primitive or non-existent, and data sharing was not viewed as essential. In addition, many of the datasets were created by projects that make up the "long tail", smaller projects that form the bulk of the projects funded by agencies such as NSF (Heidorn, 2008). Data from these projects have in the past been poorly curated and thus less visible to other scientists, largely not available, and hence named "Dark Data" (Heidorn, 2008). But as Sinha et al. (2013) emphasize, without access to the types of historical observations or legacy data that make up the “dark data” in the “long tail” of science, emerging scientific challenges will not be addressable. "...making these data available on demand must be one of the highest priorities for any enterprise seeking to develop a cyberinfrastructure capable of promoting new ways to examine the earth system through time" (Sinha et al., 2013). The paucity of marine ecosystem data available to conduct cutting edge research and the critical need for the rescue of past data were also highlighted in a recent EarthCube End-User Domain Workshop Report "Articulating Cyberinfrastructure Needs of the Ocean Ecosystem Dynamics Community" (Kinkade et al., 2013). (from proposal to NSF, 2014)

There are significant dark datasets currently unavailable from multidisciplinary programs funded in the 1970’s and 1980’s such as those from the Northwest Atlantic cold-core and warm-core rings (The Ring Group, 1981; Joyce and Wiebe, 1983). The bulk of the data served here will be from the Rings projects.

The Cold-Core Rings (CCR) studies, [1972-1976] and Warm-Core Rings (WCR) Program, [1981-1982], were major research projects in the 1970s and 1980s. Large oceanic eddies or rings form when Gulf Stream waters first meander, then separate, forming a ring of Gulf Stream water around a core of cold Slope Water or a core of warm Sargasso Sea water. The CCRs move south or southwest from their point of origin into the Sargasso Sea and are initially 150-300 kilometers in diameter and 2500-3500 meters deep. They can persist as identifiable features for up to 2 years. WCRs move to the west/southwest in the Slope Water north of the Gulf Stream. They are 100 to 200 km in diameter, extend

to at least 1500 m deep, and exist for a shorter period of time (usually less than a year) before gradually breaking up and rejoining the Gulf Stream. Both of these kinds of rings form about 5 to 8 times a year.

Rings are particularly interesting to the biologist because species living north and south of the Gulf Stream are distinctly different. Thus temperate species from the Slope Water or tropical-subtropical species from the Sargasso Sea are isolated during ring formation within their particular ring structure. Thus, a community of animals from one area is expatriated in the territory of another community of animals. As a ring decays, the water gradually takes on the physical and chemical characteristics of the surrounding non-ring water. Species outside the ring invade the ring habitat while those expatriated go to local extinction. This phenomenon provides for a large-scale natural ecological experiment that was the focus of the ring's studies.

This project is digitizing data from 33 cruises to the Northwest Atlantic Ocean that are locked in notebooks and old digital file formats and preparing them for serving online in a publically available data repository (BCO-DMO).

Each dataset has been the subject of extensive data recovery efforts and the work is continuing.

References:

Heidorn, P.B. (2008). Shedding light on the dark data in the long tail of science. Library Trends, 57(2), 280-299. doi: http://dx.doi.org/10.1353/lib.0.0036

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