CTD data collected during MOCNESS tows with both 1m2 and 10m2 mouth openings from RVIB Nathaniel B. Palmer NBP1002 in the Western Antarctic Peninsula from March to May 2010 (Antarctic_micronek project)

Website: https://www.bco-dmo.org/dataset/719221
Data Type: Cruise Results
Version: close to final
Version Date: 2016-02-11

Project
» Possible climate-induced change in the distribution of Pleuragramma antarcticum on the Western Antarctic Peninsula Shelf (Antarctic_micronek)

Contributors	Affiliation	Role
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Coverage

Spatial Extent: **N**:-63.4033 **E**:-56.5145 **S**:-70.42 **W**:-76.8703
Temporal Extent: 2010-03-10 - 2010-04-27

Dataset Description

CTD observations taken simultaneously during MOCNESS tows,

The MOCNESS is based on the Tucker Trawl principle (Tucker, 1951). The particular MOCNESS system from which these CTD data came is one of two net systems. The MOCNESS-1 has nine rectangular nets (1m x 1.4 m) which are opened and closed sequentially by commands through conducting cable from the surface (Wiebe *et al.*, 1976). In both systems, "the underwater unit sends a data frame, comprised of temperature, depth, conductivity, net-frame angle, flow count, time, number of open net, and net opening/closing, to the deck unit in a compressed hexadecimal format every 2 seconds and from the deck unit to a microcomputer every 4 seconds... Temperature (to approximately 0.01 deg C) and conductivity are measured with SEABIRD sensors. Normally, a modified T.S.K.-flowmeter is used... Both the temperature and conductivity sensors and the flow meter are mounted on top of the frame so that they face horizontally when the frame is at a towing angle of 45deg... Calculations of salinity (to approximately 0.01 o/oo S), potential temperature (theta), potential density (sigma), the oblique and vertical velocities of the net, and the approximate volume filtered by each net are made after each string of data has been received by the computer." (Wiebe *et al.*, 1985)

It should be noted that due to Antarctic cold, the first few minutes of data are often of questionable value as they are extremely variable and have a high frequency of "50.000" (indicating "bad values") in the temp, theta

and sal fields. Once the sensors encounter deeper, warmer water, they start recording good values.

For additional information, contact the chief scientist for the cruise.

Methods & Sampling

The MOCNESS is based on the Tucker Trawl principle (Tucker, 1951). The particular MOCNESS system from which these CTD data came is one of two net systems. The MOCNESS-1 has nine rectangular nets (1m x 1.4 m) which are opened and closed sequentially by commands through conducting cable from the surface (Wiebe et al., 1976). The MOCNESS-10 (with 10 m2 nets)carries 6 nets of 3.0-mm circular mesh. In both systems, 'the underwater unit sends a data frame, comprised of temperature, depth, conductivity, net-frame angle, flow count, time, number of open net, and net opening/closing, to the deck unit in a compressed hexadecimal format every 2 seconds and from the deck unit to a microcomputer every 4 seconds... Temperature (to approximately 0.01 deg C) and conductivity are measured with SEABIRD sensors. Normally, a modified T.S.K.-flowmeter is used... Both the temperature and conductivity sensors and the flow meter are mounted on top of the frame so that they face horizontally when the frame is at a towing angle of 45deg... Calculations of salinity (to approximately 0.01 o/oo S), potential temperature (theta), potential density (sigma), the oblique and vertical velocities of the net, and the approximate volume filtered by each net are made after each string of data has been received by the computer.' (Wiebe et al., 1985)

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Data Files

File
ctd_mocness.csv (Comma Separated Values (.csv), 16.49 MB) MD5:bad54638a99fcd74e88b980daf36b35b Primary data file for dataset ID 719221

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Related Publications

Fofonoff, N. P., & Millard Jr, R. C. (1983). Algorithms for Computation of Fundamental Properties of Seawater. Endorsed by Unesco/SCOR/ICES/IAPSO Joint Panel on Oceanographic Tables and Standards and SCOR Working Group 51. Unesco Technical Papers in Marine Science, No. 44.
Methods

Tucker, G.H.(1951) Relation of fishes and other organisms to the scattering of underwater sound Journal of Marine Research, 10, pp. 215-238
Methods

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.
Methods

Wiebe, P. H., Morton, A. W., Bradley, A. M., Backus, R. H., Craddock, J. E., Barber, V., ... Flierl, G. R. (1985).

New development in the MOCNESS, an apparatus for sampling zooplankton and micronekton. Marine Biology, 87(3), 313–323. doi:10.1007/bf00397811 https://doi.org/10.1007/BF00397811
Methods

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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 time, 1-31	
month_local	month of year, local time, 1 - 12	
yrday_local	year day as a decimal, based on Julian calendar, local; includes time due to precision	YYY.Yyyyyy
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	Conductivity, Temperature, Depth
Generic Instrument Name	CTD - profiler
Generic Instrument Description	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. It permits scientists to observe the physical properties in real-time via a conducting cable, which is typically connected to a CTD to a deck unit and computer on a 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 term applies to profiling CTDs. For fixed CTDs, see https://www.bco-dmo.org/instrument/869934.

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

NBP1002

Website	https://www.bco-dmo.org/deployment/474285
Platform	RVIB Nathaniel B. Palmer
Report	http://dmoserv3.bco-dmo.org/data_docs/Antarctic_micronek/NBP10-02SitRepWhole.docx
Start Date	2010-03-16
End Date	2010-05-02

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Project Information

Possible climate-induced change in the distribution of Pleuragramma antarcticum on the Western Antarctic Peninsula Shelf (Antarctic_micronek)

Coverage: Western Antarctic Peninsula

*Pleuragramma antarcticu*m, the Antarctic silverfish, plays a key role in the trophic pyramid of the Antarctic coastal ecosystem, acting as food for larger fishes, flying and non-flying seabirds, pinnipeds, and whales. In turn, they are predators on coastal euphausiids, including both *Euphausia superba* and *E. crystallorophias*. Historically, *Pleuragramma* have been an important food source for Adélie Penguins of the Western Antarctic Peninsula (WAP), but during the last decade *Pleuragramma* have disappeared from the Adélie diet. We suggest that *Pleuragramma*'s absence from the diets of top predators is linked to the declining sea ice canopy, which serves as a nursery for eggs and larvae during the austral spring. The research will investigate four hydrographic regimes over the WAP continental shelf with the following features: (1) persistent gyral flows that act to retain locally spawned larvae, (2) spring sea ice that has declined in recent years (3) the prevalence of adult silverfish, and (4) the presence of breeding Adélie penguins whose diets vary in the proportions of silverfish consumed. The research will evaluate the importance of local reproduction versus larval advection, and the extent to which populations in the subregions of study are genetically distinct, via analysis of population structure, otolith microchemistry and molecular genetics of fish. The *Pleuragramma* data will be

compared with penguin diet samples taken synoptically.

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Funding

Funding Source	Award
NSF Antarctic Sciences (NSF ANT)	ANT-0741348

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