CTD data from MOCNESS tows taken in the Antarctic in 2011 from ARSV Laurence M. Gould LMG1110 in the Southern Ocean from November to December 2011 (Salp_Antarctic project)

Website: https://www.bco-dmo.org/dataset/488871
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Project
» Population ecology of Salpa thompsoni based on molecular indicators (Salp_Antarctic)

Contributors	Affiliation	Role
Bucklin, Ann	University of Connecticut (UConn - Avery Point)	Principal Investigator
Allison, Dicky	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

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Coverage

Spatial Extent: **N**:-60.5842 **E**:-53.7512 **S**:-64.9837 **W**:-69.2906
Temporal Extent: 2011-11-09 - 2011-11-25

Dataset Description

CTD data collected during the 1 meter2 MOCNESS tows to the Cape Shirreff area in the Antarctic . These data are part of the standard suite of measurements collected during the net tows to provide environmental background for the animals collected.

Fluorescence was not collected during these tows.

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)

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Data Files

File
ctd_mocness_conf.csv(Comma Separated Values (.csv), 7.94 MB) MD5:cd721f870f1e8fb49c14750f8a9b3bfe Primary data file for dataset ID 488871

[ ]

Parameters

Parameter	Description	Units
cruiseid	cruise identification, e.g. LMG1110, for ARSV Gould cruise 1110	
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	decibars
potemp	potential temperature or theta1 1Fofonoff and Millard, 1983, UNESCO technical papers in Marine Sciences, #44	
sal	salinity calculated from conductivity, bad values are set to 50	
sigma_0	Sigma-theta or potential density11Fofonoff 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	meters^3
net	MOCNESS net number, (00-08)	
lat	latitude, negative = South	DD.D
lon	longitude, negative = West	DDD.D
altim	The Altimeter provides data on the altitude of the net systems above the bottom when the net system is closer to the bottom than to the surface.	meters

Instruments

Dataset-specific Instrument Name	CTD MOCNESS
Generic Instrument Name	CTD MOCNESS
Dataset-specific Description	"The MOCNESS was provided by Raytheon and it was equipped with nine 335-mesh nets. In addition to the standard temperature and conductivity probes it was also equipped with a beta-type strobe unit provided by BESS Co. and a Benthos 200 kHz altimeter. The underwater unit used through the cruise was #156." p.33 of Cruise Report LMG1110.
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)

Deployments

LMG1110

Website	https://www.bco-dmo.org/deployment/58728
Platform	ARSV Laurence M. Gould
Report	http://data.bcodmo.org/LMG11-10/LMG11-10_Cruise_Report_06dec11.pdf
Start Date	2011-11-02
End Date	2011-12-01
Description	UNOLS STRS record: http://strs.unols.org/Public/diu_cruise_view.aspx?cruise_id=127242 The primary science objectives of the cruise are to examine genome-wide patterns of gene expression, target gene expression levels, and patterns of population genetic diversity and structure of the Antarctic salp, Salpa thompsoni in relation to biological and physical environmental parameters in the Western Antarctic Peninsula region. High-frequency acoustics data will be used to provide information about the distribution of salps, krill, and other zooplankton. Sampling from shelf and oceanic waters between 0 and 2,000 meters will take place at selected stations using a 1-meter^2 MOCNESS to characterize the planktonic assemblage, and a Reeve net to collect live material for molecular and biochemical analysis. Environmental parameters to be measured include standard hydrographic variables (temperature, salinity, and depth), as well as fluorescence and turbidity. Water samples will be collected using a CTD rosette to determine chlorophyll concentration. An additional science objective is to develop a method of using acoustics to assess the abundance and distribution of salps in the Southern Ocean. Cruise Data Report **Processing Description** See pages 33-37 in the Cruise Report for a description of the MOCNESS set up and processing activities on LMG1110.

Project Information

Population ecology of Salpa thompsoni based on molecular indicators (Salp_Antarctic)

Coverage: Southern Ocean

The Antarctic salp, *Salpa thompsoni*, is an increasingly important player in the vulnerable Antarctic Peninsula pelagic ecosystem. Observations of high abundance of Salpa thompsoni during the summer in the Southern Ocean suggest that this species is capable of rapid somatic and population growth, and frequently forms dense blooms under favorable environmental conditions. The proposed research will examine genome-wide patterns of gene expression, target gene expression levels, and patterns of population genetic diversity and structure of the target salp species. Our preliminary results and data analysis have provided a promising basis for transcriptomic studies of *S. thompsoni* in the Southern Ocean. The proposed next steps in our genomic/transcriptomic analysis of *Salpa thompsoni* are: 1) completion of a reference transcriptome as a basis for genome-wide analysis of gene expression; 2) whole transcriptome shotgun sequencing (RNA-Seq) analysis to characterize gene expression in relation to individual characteristics and environmental conditions; 3) quantitative real-time PCR (qRT-PCR) characterization and validation of gene expression for 10-20 top differentially-expressed genes; and 4) detection of strand-specific allelic variation at SNP (Single Nucleotide Polymorphic) sites to analyze clonal diversity and population genetic diversity and structure. We hypothesize that: 1) deep analysis of the Salpa thompsoni transcriptome will reveal significant associations among selected set of differentially-expressed genes and critical life history stages and events (e.g., ontogenetic maturation, sexual reproduction, senescence) of the salp; and 2) the species will show variable levels of clonal diversity and significant genetic differentiation among salp populations in different regions of the Southern Ocean. Samples will be obtained from research cruises during 2011-2013 in diverse regions of the Southern Ocean; dedicated sample and data collection will be carried out during a cruise of the R/V LM GOULD (LMG11-10) to the Western Antarctic Peninsula region in November, 2011. The significance of this effort lies in new understanding of the molecular processes underlying the complex life history and population dynamics of *S. thompsoni* in relation to the Antarctic pelagic ecosystem and extreme and variable environmental conditions of the Southern Ocean.

Most of the data from this project are available from the Marine Geoscience Data System (MGDS), part of IEDA and is available at http://www.marine-geo.org/tools/search/Files.php?data_set_uid=18148.

Funding

Funding Source	Award
NSF Antarctic Sciences (NSF ANT)	ANT-1044982