IKMT samples and underwater video recordings collected in the Drake Passage from R/V Laurence M. Gould (LMG1504, LMG1509, LMG1410) from 2014-2015

Website: https://www.bco-dmo.org/dataset/705556
Data Type: Cruise Results
Version: 1
Version Date: 2017-06-19

Project
» Pilot Study: Addition of Biological Sampling to Drake Passage Transits of the "L.M. Gould" (DrakeBioGould)

Contributors	Affiliation	Role
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Abstract
IKMT samples and underwater video recordings collected in the Drake Passage from R/V Laurence M. Gould (LMG1504, LMG1509, LMG1410) from 2014-2015

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Coverage

Spatial Extent: **N**:-54.0093 **E**:-54.7694 **S**:-65.1842 **W**:-67.162
Temporal Extent: 2014-10-29 - 2015-11-11

Dataset Description

IKMT samples and underwater video recordings collected during Drake Passage transits from LMG14-10, LMG15-04 and LMG15-09.

Methods & Sampling

Net Sampling:

Open oblique net tows were made with a 1.8 m Isaacs-Kidd Midwater Trawl (IKMT), fitted with 505 um mesh and a protected cod end, fished from 0 to ~155m at ship speeds of ~2 kts.

During LMG14-10 and LMG15-04 an underwater video camera system was suspended from the IKMT spreader bar allowing video recordings of material being fished by the net at some stations (indicated in data log).

Data Processing Description

Wet Weight Displacement Volume: Wet weight displacement volume measurements (minus gelatinous organisms, including salps) were made for all freshly collected samples. Additional wet weight displacement volume estimates were made for large and small sized zooplankton fractions, the separation of which is largely dependent on the ability to identify and adequately enumerate taxa. Maximum lengths of the small fraction generally were ≤ 10 mm (e.g., copepods, shelled pteropods, ostracods, larval euphausiids and other crustaceans). Due to their large length range chaetognaths were represented in both categories but are treated as part of the small fraction. Large taxa (e.g., ~10-20 mm) include postlarval euphausiids, amphipods and polychaetes. Wet weight displacement volumes determined separately for "extra large" (e.g., >20 mm) postlarval myctophids and Antarctic krill (Euphausia superba) are included with the large taxa.

Taxonomic Identification and Enumeration: The taxonomic identification (to species level if possible, abundance estimates (numbers m-2 and numbers 1000 m-3) and length measurements of known sound scattering organisms were made for as many samples as possible while onboard. This was generally possible for samples collected during southbound transits and opportunistically in the Antarctic Coastal Zone. In order to provide data from the Antarctic Zone comparable to those from long-term data bases off the Antarctic Peninsula (e.g., Loeb et al., 2008, 2010; Loeb and Santora, 2013) all postlarval Antarctic krill (Euphausia superba) and salps (Salpa thompsoni) were removed and enumerated from samples <2 L; for larger catches, abundance estimates were based on 1 to 2 L subsamples. All postlarval krill in samples with <100 individuals were measured, sexed and staged according to Makarov & Denys (1981); in larger samples at least 100 krill were analyzed. The 2 salp life stages were enumerated and internal body lengths of each (Foxton, 1966) were measured to the nearest mm.

Because of time limitations during northbound transits, generally only the large size fractions could be processed onboard; as a consequence representative 4% buffered formalin preserved aliquots of the small size fraction were analyzed at Moss Landing Marine Labs (MLML) following each cruise. Finer resolution identifications of abundant large taxa (e.g., similar euphausiid and pteropod species) in formalin-preserved samples were also made at MLML following completion of field efforts. Due to a combination of funding, time and/or expertise constraints, species identifications of various abundant small zooplankton categories (e.g., euphausiid larvae and copepods) were limited.

BCO-DMO Data Processing Notes:

-reformatted column names to comply with BCO-DMO standards
-compiled each deployment into one table

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Data Files

File	
net_tow_data.csv	(Comma Separated Values (.csv), 7.47 KB) MD5:a624ac3aa69ee9ff3638eaf4b7119a40
Primary data file for dataset ID 705556	

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Parameters

Parameter	Description	Units
station	Station where samples were taken	unitless

date	Date samples were taken; YYYY/MM/DD	unitless
start_GMT	Start time of net tow; HH:MM	unitless
end_GMT	End time of net tow; HH:MM	unitless
lat_deg	Latitude; degrees (S)	degrees minutes
lat_min	Latitude; minutes	degrees minutes
lat	Latitude in decimal degrees	decimal degrees
lon_deg	Longitude; degrees (W)	degrees minutes
lon_min	Longitude; minutes	degrees minutes
lon	Longitude in decimal degrees	decimal degrees
biogeographic_zone	Code for the biogeographic zone in which sampling took place: SAZ=Subantarctic Zone; PFZ=Polar Frontal Zone; AZ=Antarctic Zone; ACZ=Antarctic Coastal (Continental) Zone	unitless
DIEL	Indicates day night or twiglight sample collection on net deployment 1 hour before and after local sunrise and sunset.	unitless
volume_filtered	Volume of water filtered through the net	meters cubed
SST	Sea surface temperature	celsius
bottom_depth	Bottom depth at sampling location	meters
wind_speed	Wind speed at time of sampling	knots
wind_direction	Wind direction at time of sampling	degrees
tow_depth	The depth at which the net tow took plac	meters
underwater_video	Indicates whether videorecordings were made at each station and if so to what depths.	unitless

notes	Notes and observations	unitless
ISO_DateTime_UTC	Date/Time (UTC) ISO formatted	unitless

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Instruments

Dataset-specific Instrument Name	GoPro Hero3+ Black Edition
Generic Instrument Name	Camera
Dataset-specific Description	Used for underwater video recording
Generic Instrument Description	All types of photographic equipment including stills, video, film and digital systems.

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Deployments

LMG1504

Website	https://www.bco-dmo.org/deployment/705487
Platform	ARSV Laurence M. Gould
Start Date	2015-04-07
End Date	2015-05-11
Description	RV L.M. Gould Drake Passage transects

LMG1509

Website	https://www.bco-dmo.org/deployment/705488
Platform	ARSV Laurence M. Gould
Start Date	2015-10-24
End Date	2015-11-11
Description	RV L.M. Gould Drake Passage transects

LMG1410

Website	https://www.bco-dmo.org/deployment/705486
Platform	ARSV Laurence M. Gould
Start Date	2014-10-27
End Date	2014-11-22
Description	RV L.M. Gould Drake Passage transects

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Project Information

Pilot Study: Addition of Biological Sampling to Drake Passage Transits of the "L.M. Gould" (DrakeBioGould)

Coverage: Drake Passage, South Shetland Islands

PI supplied abstract:

A 50+ year warming trend in the Southern Ocean has been most dramatic in Drake Passage and likely impacts ecosystem structure here. Acoustic Doppler Current Profiler (ADCP) records from multiple NSF “L.M. Gould” supply transits of Drake Passage from 1999 to present demonstrate spatial and temporal variability in acoustics backscattering. Acoustics backscattering strength in the upper water column corresponds to zooplankton and nekton biomass that supports predator populations. However, for much of Drake Passage the identity of taxa contributing to this acoustically detected biomass is not known. This project would introduce a biological component to “L.M. Gould” transits of Drake Passage with the goal of determining the identity of taxa responsible for the backscattering records obtained by ADCP and relating these to higher trophic levels (seabird/marine mammal). Net sampling during spring and fall transits will permit assessment of diel and seasonal changes in the abundance and taxonomic composition of zooplankton and top predators represented between Patagonia and the Antarctic Peninsula. Net samples and depth-referenced video records taken in conjunction with ADCP profiles will permit the identification of the dominant acoustic backscatters in the 3 biogeographic regions represented here, the Subantarctic, Polar Frontal, and Antarctic Zones. The validity of dominant backscattering taxa in the Antarctic Zone will be tested by comparing the ADCP records with abundant zooplankton data collected off the Antarctic Peninsula during January-March 1999-2009 as well with long-term top predator surveys. The broader impacts also included cruise blogs to Moss Landing Marine Laboratories and Monterey Academy of Oceanographic Science (Monterey High School, Monterey CA) plus involvement with MAOS faculty and students providing first-hand data and insight into marine research in a near real-time format. The faculty used this opportunity to engage students in “real” science while focusing on implementing instruction using the Next Generation Science Standards.

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Funding

Funding Source	Award
NSF Office of Polar Programs (formerly NSF PLR) (NSF OPP)	PLR-1347911

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