CTD downcasts from R/V Savannah SAV-15-10, SAV-15-19, SAV-15-31 in the South Atlantic Bight, Mid-Continental Shelf from May to December 2015 (Doliolid Diet project)

Website: https://www.bco-dmo.org/dataset/699169
Data Type: Cruise Results
Version: 1
Version Date: 2017-05-01

Project
» The cryptic diet of the globally significant pelagic tunicate Dolioletta gegenbauri (Uljanin, 1884.) (Doliolid Diet)

Contributors	Affiliation	Role
Frischer, Marc E.	Skidaway Institute of Oceanography (SkIO)	Principal Investigator
Gibson, Deidre M.	Hampton University	Co-Principal Investigator
Copley, Nancy	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
CTD downcasts from R/V Savannah SAV-15-10, SAV-15-19, SAV-15-31 in the South Atlantic Bight, Mid-Continental Shelf from May to December 2015. Data from 2016 and 2017 will be added once validated.

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Coverage

Spatial Extent: **N**:31.54934 **E**:-80.2083 **S**:29.945 **W**:-80.64218
Temporal Extent: 2015-05-19 - 2015-12-02

Dataset Description

This dataset includes CTD data from 23 casts in water depth of 25 to 40 meters from three cruises in May, August and December 2015 on the RV/Savannah to the South Atlantic Bight. In addition to salinity, conductivity, temperature and depth, also reported are light, fluorescence, oxygen saturation and nitrogen saturation.

Methods & Sampling

CTD sampling methodology is standardized by the marine technician and crew of the UNOLS vessel R/V Savannah. Down-cast and up-cast winch speed is maintained at 25 m/min unless sea conditions require alteration. The CTD is deployed to 2 to 1.5m above the surface of the bottom to minimize benthic influences on the water samples and the possibility of damaging the instruments. All water samples are collected in Niskin bottles are retrieved on the upcast after allowing the CTD to equilibrate at the desired depth for at least 30 seconds. Data from the CTD carousel is archived to an onboard Server running Windows Server 2012 at 4 hz as hex files with header and bottle files. The software used to control the CTD is Seaterm and Seasave.

Data quality control is monitored in real time during each cast by comparing surface salinity and temperature to the thermosalinograph data. Sensors are maintained to manufacture specifications and calibrated as specified by the manufacturer or as needed if anomaly's or drift is observed. The precision and accuracy of the data is dependent on the limitation of each individual sensor and the rate of change in depth of the CTD through the water column vs. the frequency of data collection. For a list of the sensors used: deployed sensors. Data is provided to the chief scientist from the ship as raw data at the end of each research deployment.

Data Processing Description

Raw CTD data was accessed using the SBE Data Processing software (ver 7.23.2, Sea-Bird Electronics, Inc.). The data conversion feature of the software was used to convert the raw hex data to an ascii format. For each CTD cast, data was converted only from the scans that were made during the down casts of the CTD deployments. Scans were stored as converted data files (.cnv). A total of 22 variables were converted from the CTD scans and included location, time, depth, temperature, salinity, and conductivity parameters. Microsoft Excel was used to archive the converted data. No further data processing was performed on the converted files.

BCO-DMO Processing Notes:
- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- added columns for cruise id, cast, lat_start, lon_start. date, time obtained from CTD cast headers

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Parameters

Parameter	Description	Units
cruise_id	cruise identifier	unitless
cast	cast number	unitless
lat_start	cast starting latitude; north is positive	decimal degrees
lon_start	cast ending longitude; east is positive	decimal degrees
date	UTC date	unitless
time_start	UTC time at start of cast	unitless
Depth1_m	depth	meters
Depth2_m	depth of water?	meters
Latitude_deg	latitude; north is positive	decimal degrees

Longitude_deg	longitude; east is positive	decimal degrees
Salinity_PSU	salinity	PSU
Temperature_C	temperature	degrees Celsius
Voltage_0	output of 1st voltage sensor	volts
Conductivity_uS_cm	conductivity	microSiemens/cm
Conductivity_mS_cm	conductivity	milliSiemens/cm
Conductivity_S_m	conductivity	Siemens/m
Density_kg_m3	density	kilograms/m^3
Density_sigma_theta_kg_m3	potential density which takes into account adiabatic heating/cooling with changes in pressure	kilograms/m^3
Density_sigma_t_kg_m3	potential density	kilograms/m^3
Density_sigma_1_kg_m3	potential density	kilograms/m^3
Density_sigma_2_kg_m3	potential density	kilograms/m^3
Descent_Rate_m_s	descent rate of CTD	meters/sec
Fluorescence_mg_m3	fluorescence WET Labs WETstar	milligram/meter^3
Fluorescence_2_mg_m3	fluorescence WET Labs WETstar	milligram/meter^3
Fluorescence_Diff2_1_mg_m3	fluorescence WET Labs WETstar difference of second from first reading	milligram/meter^3
Time_Elapsed_min	time elapsed since start of cast	minutes
Voltage_1	output of 2nd voltage sensor	volts

Voltage_2	output of 3rd voltage sensor	volts
Voltage_3	output of 4th voltage sensor	volts
Voltage_4	output of 5th voltage sensor	volts
PAR	Photosynthetically Available [Active] Radiation; downwelling irradiance; Biospherical/Licor	microEinsteins/m^2 sec
Oxygen_pcent_sat	oxygen saturation: the ratio of calculated oxygen to oxygen saturation	percent
Nitrogen_Saturation_mg_l	nitrogen saturation: the theoretical saturation limit of the water at the local temperature and salinity value but with local pressure reset to zero (1 atmosphere)	milligrams/liter
Acceleration_m_s2	acceleration of CTD through water	meter/second^2
flag	quality flag; 0 = ok?	unitless

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Instruments

Dataset-specific Instrument Name	Sea-Bird 25
Generic Instrument Name	Sea-Bird SBE 25 Sealogger CTD
Dataset-specific Description	temp_sn, cond_sn, Real-Time Sample, Interval (sec) SAV_15-10, 2336, 1909, 0.25 SAV_15-19, 2336, 1909, 0.25 SAV-15-31, 2684, 2868, 0.25
Generic Instrument Description	The Sea-Bird SBE 25 SEALOGGER CTD is battery powered and is typically used to record data in memory, eliminating the need for a large vessel, electrical sea cable, and on-board computer. All SBE 25s can also operate in real-time, transmitting data via an opto-isolated RS-232 serial port. Temperature and conductivity are measured by the SBE 3F Temperature sensor and SBE 4 Conductivity sensor (same as those used on the premium SBE 9plus CTD). The SBE 25 also includes the SBE 5P (plastic) or 5T (titanium) Submersible Pump and TC Duct. The pump-controlled, TC-ducted flow configuration significantly reduces salinity spiking caused by ship heave, and in calm waters allows slower descent rates for improved resolution of water column features. Pressure is measured by the modular SBE 29 Temperature Compensated Strain-Gauge Pressure sensor (available in eight depth ranges to suit the operating depth requirement). The SBE 25's modular design makes it easy to configure in the field for a wide range of auxiliary sensors, including optional dissolved oxygen (SBE 43), pH (SBE 18 or SBE 27), fluorescence, transmissivity, PAR, and optical backscatter sensors. More information from Sea-Bird Electronics: http:www.seabird.com.

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Deployments

SAV-15-19

Website	https://www.bco-dmo.org/deployment/692295
Platform	R/V Savannah
Start Date	2015-08-03
End Date	2015-08-05
Description	Doliolid studies

SAV-15-31

Website	https://www.bco-dmo.org/deployment/692325
Platform	R/V Savannah
Start Date	2015-12-01
End Date	2015-12-02
Description	Doliolid studies

SAV-15-10

Website	https://www.bco-dmo.org/deployment/692323
Platform	R/V Savannah
Start Date	2015-05-19
End Date	2015-05-20
Description	Doliolid studies

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Project Information

The cryptic diet of the globally significant pelagic tunicate Dolioletta gegenbauri (Uljanin, 1884.) (Doliolid Diet)

Coverage: South Atlantic Bight

Project description from NSF award abstract:
Gelatinous (soft-bodied) zooplankton can play a crucial role in food webs and in cycling of materials in the world's oceans, and it has been suggested that they may become even more important in the future. However, because they are so difficult to study, gelatinous species remain poorly understood. This is especially true for smaller filter feeding gelatinous animals such as pelagic tunicates (salps, larvaceans, and doliolids). For example, it remains unclear what and how much these abundant filter feeders eat in nature and who eats them. This project will address this large and significant knowledge gap by using a combination of new and traditional methods to investigate the diet of the gelatinous pelagic tunicate *Dolioletti gegenbauri*, a species common on productive continental shelves such as the South Atlantic Bight. This project will also help train the next generation of ocean scientists to be competent in classical biology, modern molecular biology, and

ecosystem modeling. Training will also focus on increasing representation of African Americans in the future science, technology, engineering, and math (STEM) workforce.

This study will provide the first quantitative estimates of the in situ diet of a key continental shelf gelatinous zooplankton species, the doliolid *Dolioletta gegenbauri*. Large blooms of doliolids have the potential to control the trophic structure of shelf pelagic ecosystems by shunting primary production to the microbial food web and by limiting copepod production via the consumption of their eggs. The long-term objective is to understand the ecological role and significance of doliolids in continental shelf pelagic ecosystems, specifically the underlying processes that lead to their high level of spatial and temporal patchiness. The basic questions to be addressed here include: What do doliolids eat, in situ, at different life stages? Are early life stages of larger metazoans important components of their diets? Do doliolids act as trophic cascade agents promoting primary production and phytoplankton diversity? Because of methodological challenges, there have not yet been definitive studies addressing these fundamental questions. In this project, the investigators will conduct field-based studies that will combine state-of-the art molecular techniques with more traditional methods in zooplankton ecology to answer questions about trophic interactions. Monthly oceanographic expeditions in the South Atlantic Bight will allow the research team to study wild doliolids at different time points in their life cycle and under different plankton bloom conditions. Application of recently developed molecular diagnostic assays will enable the quantitative description of the diversity and quantity of prey consumed, unbiased by experimental manipulation. Additional experimental and theoretical modeling will allow the investigators to link these data with larger ecological significance and scale.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1459293
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