Hydrographic data collected by CTD during RVIB Nathaniel B. Palmer cruise in the Ross Sea, Southern Ocean from 2017-2018

Website: https://www.bco-dmo.org/dataset/783911
Data Type: Cruise Results
Version: 1
Version Date: 2020-01-03

Project
» Collaborative Research: Cobalamin and Iron Co-Limitation Of Phytoplankton Species in Terra Nova Bay (CICLOPS)

Contributors	Affiliation	Role
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Abstract
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Coverage

Spatial Extent: **N**:-64.7219 **E**:-173.5369 **S**:-78.6295 **W**:179.9983
Temporal Extent: 2017-12-26 - 2018-02-19

Dataset Description

Hydrographic data collected by CTD during RVIB Nathaniel B. Palmer cruise in the Ross Sea, Southern Ocean from 2017-2018.

Methods & Sampling

Hydrography data were collected using a Sea-Brid SBE 9 CTD with an SBE 11plus deck unit. The CTD was equipped with sensors to measure temperature, conductivity, pressure, dissolved oxygen, fluorescence, altimetry, beam transmission and irradiance.

Locations: Amundsen Sea, Ross Sea, Terra Nova Bay

Data Processing Description

Data collected from the CTD were processed using Seasave version 7.26.1.8. The data included are from the downcasts.

BCO-DMO Data Manager Processing Notes:
* added a conventional header with dataset name, PI name, version date
* modified parameter names to conform with BCO-DMO naming conventions (spaces, +, and - changed to underscores). Units in parentheses removed and added to Parameter Description metadata section.
* Concatenated 79 .csv files into one tabular dataset.
* Added column "Station" with the station number from the originally submitted csv filename.
* Changed date format from m/d/Y to ISO 8601 formatted date Y-m-d
* Extracted time from "Julian Day" and "Date" to construct ISO_DateTime_UTC.
* Data sorted by ISO_DateTime_UTC,Station,Pressure,Depth

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Data Files

File
ctd.csv (Comma Separated Values (.csv), 11.43 MB) MD5:08a501c03b22d5018bb938c5f4ba1d40 Primary data file for dataset ID 783911

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Supplemental Files

File
NBP1801 HD Stations1 filename: NBP1801_HD_Stations1.jpg (JPEG Image (.jpg), 285.92 KB) MD5:69b967cbb1d338c3f0832d4b35819971 Detailed map of stations labeled in 'Map 1' box show in image NBP1801_Stations_Map_Labeled.jpg. The numbers shown correspond to the station numbers in the dataset.
NBP1801 HD Stations2 filename: NBP1801_HD_Stations2.jpg (JPEG Image (.jpg), 235.06 KB) MD5:ef32729c88fff60f23d60aa459fb41e0 Detailed map of stations labeled in 'Map 2' box show in image NBP1801_Stations_Map_Labeled.jpg. The numbers shown correspond to the station numbers in the dataset.
NBP1801 HD Stations3 filename: NBP1801_HD_Stations3.jpg (JPEG Image (.jpg), 272.87 KB) MD5:39ffaa83840fe32f1ce4aa05db4e6baa Detailed map of stations labeled in 'Map 3' box show in image NBP1801_Stations_Map_Labeled.jpg. The numbers shown correspond to the station numbers in the dataset.
NBP1801 Stations Map_Labeled filename: NBP1801_Stations_Map_Labeled.jpg (JPEG Image (.jpg), 183.41 KB) MD5:3ba1780434d08d8f1204015b6c567aa6 Map of all stations sampled for CTD hydrography. Stations are grouped into three boxes that correspond with more detailed maps.

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Parameters

Parameter	Description	Units
Station	Station	unitless
Date	Date in format yyyy-mm-dd	unitless
Julian_Day	Decimal day of year. Days since Jan 1st of the calendar year with time included as fractional days.	days
ISO_DateTime_UTC	Timestamp (UTC) in standard ISO 8601:2004(E) format YYYY-mm-ddTHH:MM:SSZ	unitless
Pressure	Pressure	decibars (db)
Depth	Depth	meters (m)
Temperature	Temperature (sensor 1)	degrees Celsius (C)
Temperature_2	Temperature (sensor 2)	degrees Celsius
Conductivity	Conductivity (sensor 1)	milliSiemens per centimeter (mS/cm)
Conductivity_2	Conductivity (sensor 2)	milliSiemens per centimeter (mS/cm)
Oxygen	Oxygen (sensor 1)	millileters per liter (mL/L)
Oxygen_2	Oxygen (sensor 2)	millileters per liter (mL/L)
Fluorescence	Fluorescence	micrograms per cubic meter (mg/m^3)
Beam_Transmission	Beam Transmission	percent (%)
PAR_Irradiance	PAR/Irradiance	micromoles photons per meters squared per second (umol photons/m^2/s)
Latitude	Latitude, degrees North	decimal degrees

Longitude	Longitude, degrees East	decimal degrees
Altimeter	Altitude	meters (m)
SPAR_Surface_Irradiance	SPAR/Surface Irradiance	micromoles photons per meters squared per second (umol photons/m^2/s)
Time_Elapsed	Time Elapsed	seconds
Scan_Count	Scan Count	unitless
Salinity	Salinity (sensor 1)	PSU
Salinity_2	Salinity (sensor 2)	PSU
Oxygen_Saturation	Oxygen Saturation	millileters per liter (mL/L)
Scans_bin	Number of scans per meter bin	count
Flag	Flag. Quality assurance tag. 0 indicates good quality data with no issues.	unitless

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Sea-Bird SBE 911plus CTD
Generic Instrument Description	[tethered, real-time] The Sea-Bird SBE 911 plus is a type of CTD instrument package for continuous measurement of conductivity, temperature and pressure. The SBE 911 plus includes the SBE 9plus Underwater Unit and the SBE 11plus Deck Unit (for real-time readout using conductive wire) for deployment from a vessel. The combination of the SBE 9 plus and SBE 11 plus is called a SBE 911 plus. The SBE 9 plus uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 plus and SBE 4). The SBE 9 plus CTD can be configured with up to eight auxiliary sensors to measure other parameters including dissolved oxygen, pH, turbidity, fluorescence, light (PAR), light transmission, etc.). more information from Sea-Bird Electronics

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Deployments

NBP1801

Website	https://www.bco-dmo.org/deployment/778919
Platform	RVIB Nathaniel B. Palmer
Report	https://service.rvdata.us/data/cruise/NBP1801/doc/NBP1801DATA.pdf
Start Date	2017-12-16
End Date	2018-03-03
Description	Start Port: Punta Arenas, Chile End Port: Hobart, Australia

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Project Information

Collaborative Research: Cobalamin and Iron Co-Limitation Of Phytoplankton Species in Terra Nova Bay (CICLOPS)

Coverage: Amundsen Sea, Ross Sea, Terra Nova Bay

NSF abstract:
Phytoplankton blooms in the coastal waters of the Ross Sea, Antarctica are typically dominated by either diatoms or Phaeocystis Antarctica (a flagellated algae that often can form large colonies in a gelatinous matrix). The project seeks to determine if an association of bacterial populations with Phaeocystis antarctica colonies can directly supply Phaeocystis with Vitamin B12, which can be an important co-limiting micronutrient in the Ross Sea. The supply of an essential vitamin coupled with the ability to grow at lower iron concentrations may put Phaeocystis at a competitive advantage over diatoms. Because Phaeocystis cells can fix more carbon than diatoms and Phaeocystis are not grazed as efficiently as diatoms, the project will help in refining understanding of carbon dynamics in the region as well as the basis of the food web webs. Such understanding also has the potential to help refine predictive ecological models for the region. The project will conduct public outreach activities and will contribute to undergraduate and graduate research. Engagement of underrepresented students will occur during summer student internships. A collaboration with Italian Antarctic researchers, who have been studying the Terra Nova Bay ecosystem since the 1980s, aims to enhance the project and promote international scientific collaborations.

The study will test whether a mutualistic symbioses between attached bacteria and Phaeocystis provides colonial cells a mechanism for alleviating chronic Vitamin B12 co-limitation effects thereby conferring them with a competitive advantage over diatom communities. The use of drifters in a time series study will provide the opportunity to track in both space and time a developing algal bloom in Terra Nova Bay and to determine community structure and the physiological nutrient status of microbial populations. A combination of flow cytometry, proteomics, metatranscriptomics, radioisotopic and stable isotopic labeling experiments will determine carbon and nutrient uptake rates and the role of bacteria in mitigating potential vitamin B12 and iron limitation. Membrane inlet and proton transfer reaction mass spectrometry will also be used to estimate net community production and release of volatile organic carbon compounds that are climatically active. Understanding how environmental parameters can influence microbial community dynamics in Antarctic coastal waters will advance an understanding of how changes in ocean stratification and chemistry could impact the biogeochemistry and food web dynamics of Southern Ocean ecosystems.

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Funding

Funding Source	Award
NSF Office of Polar Programs (formerly NSF PLR) (NSF OPP)	OPP-1644073

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