Link to NCBI BioProject on programmed cell death from RVIB Nathaniel B. Palmer NBP1302 in the Ross Sea from February to April 2013 (TRACERS project)

Website: https://www.bco-dmo.org/dataset/666389
Data Type: Cruise Results
Version: 1
Version Date: 2016-11-30

Project
» TRacing the fate of Algal Carbon Export in the Ross Sea (TRACERS)

Contributors	Affiliation	Role
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Abstract
Link to NCBI BioProject on programmed cell death from RVIB Nathaniel B. Palmer NBP1302 in the Ross Sea from February to April 2013 (TRACERS project). NCBI BioProject 'Programmed cell death in the Ross Sea'may be accessed at https://www.ncbi.nlm.nih.gov/bioproject/PRJNA350693. Data include metagenome and transcriptome sequences from seawater samples.

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Methods & Sampling

Sampling:
Water samples collected during the cruise aboard the research vessel icebreaker (RV/IB) Nathaniel B. Palmer, as part of the TRacing the fate of Algal Carbon Export in the Ross Sea (TRACERS) program included nutrients (nitrate, nitrite, silica, phosphate, DOC, DIC, dC13,). Samples for biological measurements were collected using a rosette sampler fitted with 20 12 L Niskin bottles (General Oceanics), a conductivity, temperature, and depth (CTD) sensor (Sea-Bird Electronics), an SBE 43 dissolved oxygen sensor, and a fluorometer (WET Labs). All seawater samples were stored immediately within 1 h of collection using HDPE amber bottles and all biological material was treated with 0.1% sodium azide (NaN3) solution and stored at 4ºC until analysis.

Metagenome samples:
Two liters of seawater were taken directly from Niskin bottles and filtered onto 47 mm diameter 0.22 µm size pore polycarbonate filters (Millipore) and flash frozen in liquid nitrogen for storage until later analysis. DNA was extracted using the DNeasy Plant Mini Kit from QIAGEN. Illumina adapters and primers for sequencing on PCR products were used (TruSeq). 100 bp, PE reads were generated on the Illumina HiSeq 2500 platform.

Metatranscriptome samples:
Two liters of seawater were taken directly from Niskin bottles and filtered onto 47 mm diameter 0.22 µm size pore polycarbonate filters (Millipore) and flash frozen in liquid nitrogen for storage until later analysis. Illumina

ScripSeq kit was used for library prep and ribosomal depletion was done with Epidemiology kit.

Sorted cells metagenome samples:
Size and fluorescene sorted cells (2,000) were resuspended in PBS. Genome amplification was conducted with RepliG kit. Library preparation was conducted with TruSeq kit.

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Data Files

File
Ross_Sea_sequences.csv (Comma Separated Values (.csv), 166 bytes) MD5:5a31b25c2631135155f43efa83779dd0 Primary data file for dataset ID 666389

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Parameters

Parameter	Description	Units
NCBI_accession	accession number of sequences deposited in NCBI	unitless
type	type of data	unitless
accession_link	link to accession url at NCBI	unitless

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Instruments

Dataset-specific Instrument Name	Illumina HiSeq 2500 platform
Generic Instrument Name	Automated DNA Sequencer
Generic Instrument Description	General term for a laboratory instrument used for deciphering the order of bases in a strand of DNA. Sanger sequencers detect fluorescence from different dyes that are used to identify the A, C, G, and T extension reactions. Contemporary or Pyrosequencer methods are based on detecting the activity of DNA polymerase (a DNA synthesizing enzyme) with another chemoluminescent enzyme. Essentially, the method allows sequencing of a single strand of DNA by synthesizing the complementary strand along it, one base pair at a time, and detecting which base was actually added at each step.

Dataset-specific Instrument Name	Sea-Bird Electronics
Generic Instrument Name	CTD Sea-Bird
Dataset-specific Description	To measure conductivity, temperature, and depth.
Generic Instrument Description	Conductivity, Temperature, Depth (CTD) sensor package from SeaBird Electronics, no specific unit identified. This instrument designation is used when specific make and model are not known. See also other SeaBird instruments listed under CTD. More information from Sea-Bird Electronics.

Dataset-specific Instrument Name	WET Labs
Generic Instrument Name	Fluorometer
Dataset-specific Description	To measure fluorescence
Generic Instrument Description	A fluorometer or fluorimeter is a device used to measure parameters of fluorescence: its intensity and wavelength distribution of emission spectrum after excitation by a certain spectrum of light. The instrument is designed to measure the amount of stimulated electromagnetic radiation produced by pulses of electromagnetic radiation emitted into a water sample or in situ.

Dataset-specific Instrument Name	General Oceanics
Generic Instrument Name	Niskin bottle
Dataset-specific Description	Used to collect water samples
Generic Instrument Description	A Niskin bottle (a next generation water sampler based on the Nansen bottle) is a cylindrical, non-metallic water collection device with stoppers at both ends. The bottles can be attached individually on a hydrowire or deployed in 12, 24, or 36 bottle Rosette systems mounted on a frame and combined with a CTD. Niskin bottles are used to collect discrete water samples for a range of measurements including pigments, nutrients, plankton, etc.

Dataset-specific Instrument Name	
Generic Instrument Name	Sea-Bird SBE 43 Dissolved Oxygen Sensor
Dataset-specific Description	To measure dissolved oxygen concentration
Generic Instrument Description	The Sea-Bird SBE 43 dissolved oxygen sensor is a redesign of the Clark polarographic membrane type of dissolved oxygen sensors. more information from Sea-Bird Electronics

Dataset-specific Instrument Name	
Generic Instrument Name	Thermal Cycler
Generic Instrument Description	A thermal cycler or "thermocycler" is a general term for a type of laboratory apparatus, commonly used for performing polymerase chain reaction (PCR), that is capable of repeatedly altering and maintaining specific temperatures for defined periods of time. The device has a thermal block with holes where tubes with the PCR reaction mixtures can be inserted. The cycler then raises and lowers the temperature of the block in discrete, pre-programmed steps. They can also be used to facilitate other temperature-sensitive reactions, including restriction enzyme digestion or rapid diagnostics. (adapted from http://serc.carleton.edu/microbelife/research_methods/genomics/pcr.html)

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Deployments

NBP1302

Website	https://www.bco-dmo.org/deployment/547873
Platform	RVIB Nathaniel B. Palmer
Report	http://dmoserv3.whoi.edu/data_docs/TRACERS/NBP1302_data_report.pdf
Start Date	2013-02-12
End Date	2013-04-05
Description	Ross Sea, Antarctica (53 days) RVIB Nathaniel B. Palmer : February-April 2013 McMurdo Station, Antarctica - Punta Arenas, Chile Project Title: “TRacing the fate of Algal Carbon Export in the Ross Sea” (TRACERS)Chief Scientist: Dennis Hansell, UM-RSMASProject Description: The research focus of this cruise was to investigate the biogeochemistry associated after a phytoplankton bloom at the end of the Antarctic Austral Summer. I helped analyze and coordinate analyses of nutrients (silicic acid, phosphate, and nitrate) and collect samples for dissolved organic carbon (DOC). Note R2R Link takes user to Marine Geoscience Data System (MGDS):NBP1302 Nathaniel B. Palmer Systems and Specifications

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Project Information

TRacing the fate of Algal Carbon Export in the Ross Sea (TRACERS)

Coverage: Ross Sea

Sinking particles are a major element of the biological pump and they are commonly assigned to two fates: mineralization in the water column and accumulation at the seafloor. However, there is another fate of export hidden within the vertical decline of carbon, the transformation of sinking organic matter to fine suspended and/or dissolved organic fractions. This process has been suggested but has rarely been observed or quantified. As a result, it is presumed that the solubilized fraction is largely mineralized over short time scales. However, global ocean surveys of dissolved organic carbon are demonstrating a significant water column accumulation of organic matter under high productivity environments. This proposal will investigate the transformation of organic particles from sinking to solubilized phases of the export flux in the Ross Sea. The Ross Sea experiences high export particle production, low dissolved organic carbon export with overturning circulation, and the area has a predictable succession of production and export events. In addition, the basin is shallow (< 1000 m) so the products the PIs will target are relatively concentrated. To address the proposed hypothesis, the PIs will use both well-established and novel biochemical and optical measures of export production and its fate. The outcomes of this work will help researchers close the carbon budget in the Ross Sea.

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Funding

Funding Source	Award
NSF Division of Polar Programs (NSF PLR)	PLR-1142049

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