

Underway HPLC pigments from the RVIB Nathaniel B. Palmer NBP1302 cruise in the Ross Sea during 2013 (TRACERS project)

Website: <https://www.bco-dmo.org/dataset/558893>

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Project

» [TRacing the fate of Algal Carbon Export in the Ross Sea](#) (TRACERS)

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Dataset Description

HPLC pigment analyses of underway collected samples from the NBP1302 cruise (Ross Sea, Antarctica).

Methods & Sampling

Water samples were collected from underway samples.

Chlorophyll and accessory pigment composition was analyzed by high performance liquid chromatography (HPLC; Agilent 1100). Culture aliquots were filtered on Whatmann GF/F filters, flash frozen in liquid nitrogen, and stored at -80°C until analysis. Just prior to analysis, pigments were extracted overnight in acetone at -20°C. The following day extracted pigments were centrifuged and measured using a gradient elution method (DiTullio and Geesey, 2003), a modification of the Zapata et al 2000 method. Chromatographic separation was performed using a Waters C8 symmetry column, photodiode array and fluorescence detectors. The internal standard, β -Apo-8-carotenal-trans standard (Fluka Chemical Corp., USA) was added to extracted pigments as a peak reference. Individual pigment peaks were quantified with Chemstation software (revision B.03.01, Agilent) and our pigment action spectra library calibrated using pigment standards from DHI LABS (Hoersholm, Denmark) and in-house purifications of non-commercially available pigments. Coefficient of variation among replicate HPLC injections is < 3% and our limit of detection is approximately 1 ng L⁻¹.

[Nathaniel B. Palmer Systems and Specifications](#)

Data Processing Description

Response factors for pigments were performed using dilutions of calibration standards. Full details of data processing and methods used can be found in:

DiTullio, G. R. & Geesey, M. E. (2002) Photosynthetic pigments in marine algae and bacteria. In: BITTON, G.

(ed.) The Encyclopedia of Environmental Microbiology. New York: John Wiley & Sons Inc.

BCO-DMO Processing Notes:

- Generated from original .xlsx file "NPB1302 BCO-DMO.xls, sheet: Underway Final" contributed by Emily Cooper
- Parameter names edited to conform to BCO-DMO naming convention found at [Choosing Parameter Name](#)
- Blanks (missing data) replaced with "nd" meaning "no data";
- Date reformmated to YYYYMMDD
- Time reformatted to HHMM
- Added ISO_DateTime_UTC column from original DATE and TIME fields
- Lat/Lon whole degs and minutes removed (decimal degrees preserved)
- Lat/Lons recalculated to reflect correct hemisphere signage

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Data Files

File
HPLC_Pigments_UW.csv (Comma Separated Values (.csv), 31.60 KB) MD5:0e7d58273c7fbf010c30fa07e5a2bff6
Primary data file for dataset ID 558893

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Parameters

Parameter	Description	Units
Sample_Num	Sample Number	integer
Date	Date (GMT)	YYYYMMDD
Time	Time (GMT)	HHMM
ISO_Date_Time	Date/Time (GMT (ISO formatted))	YYYY-MM-DDTHH:MM:SS[.xx]Z
Latitude	Latitude (South is negative)	decimal degrees
Longitude	Longitude (West is negative)	decimal degrees
Filt_vol	Volume Filtered	liters
Chl_C3	Chlorophyll c3	ng/L
Chl_lide	Chlorophyllide	ng/L
MgDvp	Magnesium-2;4-divinyl	ng/L
Chl_C2	Chlorophyll c2	ng/L
Chl_C1	Chlorophyll c1	ng/L
Peridinin	Peridinin	ng/L
Ph_ide	Pheophorbide a	ng/L
But19	19'-butanoyloxyfucoxanthin	ng/L
Fuco	Fucoxanthin	ng/L
Neo	Neoxanthin	ng/L
Prasino	Prasinoxanthin	ng/L
Viola	Violaxanthin	ng/L
Hex19	19'-hexanoyloxyfucoxanthin	ng/L
DD	Diadinoxanthin	ng/L
cis_Fuco	cis-Fucoxanthin	ng/L
Allo	Alloxanthin	ng/L
Diato	Diatoxanthin	ng/L
Monad	Monadoxanthin	ng/L
Zeax	Zeaxanthin	ng/L
Lutein	Lutein	ng/L
Croco	Crocoxanthin	ng/L
Chl_b	Chlorophyll b	ng/L
Chlorophyll_c2_MGDG	Chlorophyll c2 MGDG	ng/L
Chlorophyll_a_allomer	Chlorophyll a allomer	ng/L
DV_ChI_a	Divinyl chlorophyll a	ng/L
ChI_a	Chlorophyll a	ng/L
Ph_tin	Phaeophytin a	ng/L
a_Car	Alpha-carotene	ng/L
b_Car	Beta-carotene	ng/L
Total_ChI_a	Total Chlorophyll a	ng/L

Instruments

Dataset-specific Instrument Name	Trimble GPS - PCODE
Generic Instrument Name	Global Positioning System Receiver
Generic Instrument Description	The Global Positioning System (GPS) is a U.S. space-based radionavigation system that provides reliable positioning, navigation, and timing services to civilian users on a continuous worldwide basis. The U.S. Air Force develops, maintains, and operates the space and control segments of the NAVSTAR GPS transmitter system. Ships use a variety of receivers (e.g. Trimble and Ashtech) to interpret the GPS signal and determine accurate latitude and longitude.

Dataset-specific Instrument Name	HPLC
Generic Instrument Name	High-Performance Liquid Chromatograph
Dataset-specific Description	Chlorophyll and accessory pigment composition was analyzed by high performance liquid chromatography (HPLC; Agilent 1100).
Generic Instrument Description	A High-performance liquid chromatograph (HPLC) is a type of liquid chromatography used to separate compounds that are dissolved in solution. HPLC instruments consist of a reservoir of the mobile phase, a pump, an injector, a separation column, and a detector. Compounds are separated by high pressure pumping of the sample mixture onto a column packed with microspheres coated with the stationary phase. The different components in the mixture pass through the column at different rates due to differences in their partitioning behavior between the mobile liquid phase and the stationary phase.

Dataset-specific Instrument Name	Underway Seawater System
Generic Instrument Name	Pump - Surface Underway Ship Intake
Dataset-specific Description	The seawater system supplies underway seawater to the Aquarium Room, Wet Lab, Hydro Lab, Helo Deck, Helo Hangar, and Baltic Room. Green strand piping, a non-metallic, chemically resistant material has been used throughout the system to minimize algae and bacterial growth. It also maintains its structural integrity under low temperatures. Large diameter piping and a minimum of 90° turns helps prevent frazil ice formation in the system. The seawater system is also equipped with a centrifugal ice strainer/de-bubbler.
Generic Instrument Description	The 'Pump-underway ship intake' system indicates that samples are from the ship's clean water intake pump. This is essentially a surface water sample from a source of uncontaminated near-surface (commonly 3 to 7 m) seawater that can be pumped continuously to shipboard laboratories on research vessels. There is typically a temperature sensor near the intake (known as the hull temperature) to provide measurements that are as close as possible to the ambient water temperature. The flow from the supply is typically directed through continuously logged sensors such as a thermosalinograph and a fluorometer. Water samples are often collected from the underway supply that may also be referred to as the non-toxic supply. Ideally the data contributor has specified the depth in the ship's hull at which the pump is mounted.

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-1142065

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