Biological and Chemical Uptake Rate Measurements from the Arctic Ocean from 2010-2012 (ArcticNITRO project)

Website: https://www.bco-dmo.org/dataset/535763
Version: 07 May 2015
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Project
» Does competition for nitrogen between autotrophs and heterotrophs control carbon fluxes in the western coastal Arctic? (ArcticNITRO)

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Dataset Description

Biological and Chemical Uptake Rate Measurements

"UPTAKE" = Size fractionated uptake rate data

Methods & Sampling

(tbd)

Data Processing Description

BCO-DMO Processing Notes
- Generated from original file "ARCTICNITRO_MasterDataReport.xlsx, sheet: "Uptake" contributed by Patricia Yager
- "Year" parameter added
- Date reformatted to YYYYMMDD
- Parameter names edited to conform to BCO-DMO naming convention found at Choosing Parameter Name
- "nd" (no data) inserted into blank cells

- Blank lines deleted

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Data Files

File
MasterData_Uptake.csv (Comma Separated Values (.csv), 4.89 KB) MD5:09ddd97f47818f37436ebba9caeeb751 Primary data file for dataset ID 535763

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Parameters

Parameter	Description	Units
Year	Collection Year	YYYY
Sample_ID	Location of sample collection (name)	text
Date	Date of sample collection (local Alaska time)	YYYYMMDD
Latitude	Latitude of sample collection	decimal degrees
Longitude	Longitude of sample collection	decimal degrees
Size_Fraction	Size Fraction	um
Depth	Sample Depth	m
NH4_Specific_Uptake	N uptake from NH4 by organisms of size in size fraction column	1/h
NH4_Specific_Uptake_SD	N uptake from NH4 by organisms of size in size fraction column SD	dimensionless
NO2_Specific_Uptake	N uptake from NO2 by organisms of size in size fraction column	1/h
NO2_Specific_Uptake_SD	N uptake from NO2 by organisms of size in size fraction column SD	dimensionless

NO3_Specific_Uptake	N uptake from NO3 by organisms of size in size fraction column	1/h
NO3_Specific_Uptake_SD	N uptake from NO3 by organisms of size in size fraction column SD	dimensionless
Urea_Specific_Uptake	N uptake from urea by organisms of size in size fraction column	1/h
Urea_Specific_Uptake_SD	N uptake from urea by organisms of size in size fraction column SD	dimensionless
Amino_Acid_Specific_Uptake	N uptake from algal amino acids by organisms of size in size fraction column	1/h
Amino_Acid_Specific_Uptake_SD	N uptake from algal amino acids by organisms of size in size fraction column SD	dimensionless
Thymidine_Specific_Uptake	N uptake from thymidine	1/h
Thymidine_Specific_Uptake_SD	N uptake from thymidine SD	dimensionless
Leucine_Specific_Uptake	N uptake from leucine	1/h
Leucine_Specific_Uptake_SD	N uptake from leucine SD	dimensionless
NH4_Absolute_Uptake	NH4 Absolute Uptake	umol N/L h
NH4_Absolute_Uptake_SD	NH4 Absolute Uptake SD	dimensionless
NH4_Absolute_Uptake_Isotope_Dilution_Corrected	NH4 Absolute Uptake Isotope Dilution Corrected	umol N/L h
NH4_Absolute_Uptake_Isotope_Dilution_Corrected_SD	NH4 Absolute Uptake Isotope Dilution Corrected SD	dimensionless
NH4_Regeneration	NH4 Regeneration	umol N/L h
NH4_Regeneration_SD	NH4 Regeneration SD	dimensionless

NO2_Absolute_Uptake	NO2 Absolute Uptake	umol N/L h
NO2_Absolute_Uptake_SD	NO2 Absolute Uptake SD	dimensionless
NO3_Absolute_Uptake	NO3 Absolute Uptake	umol N/L h
NO3_Absolute_Uptake_SD	NO3 Absolute Uptake SD	dimensionless
Urea_Absolute_Uptake	Urea Absolute Uptake	umol N/L h
Urea_Absolute_Uptake_SD	Urea Absolute Uptake SD	dimensionless
Amino_Acid_Absolute_Uptake	Amino Acid Absolute Uptake	umol N/L h
Amino_Acid_Absolute_Uptake_SD	Amino Acid Absolute Uptake SD	dimensionless
Thymidine_Absolute_Uptake	Thymidine Absolute Uptake	umol N/L h
Thymidine_Absolute_Uptake_SD	Thymidine Absolute Uptake SD	dimensionless
Leucine_Absolute_Uptake	Leucine Absolute Uptake	umol N/L h
Leucine_Absolute_Uptake_SD	Leucine Absolute Uptake SD	dimensionless

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Deployments

ArcticNitro_Barrow

Website	https://www.bco-dmo.org/deployment/535682
Platform	ArcticNitro
Start Date	2010-08-30
End Date	2012-01-19
Description	Extracted from the NSF proposal Study sites: Because of its unique combination of year-round access to the coastal Arctic Ocean and strong scientific support system (Barrow Arctic Science Consortium we propose to make our primary winter and summer measurements from Barrow, Alaska. At 71°N, Barrow receives 24- hour sunlight between May 10 and August 2, and is in 24-h darkness between November 18 and January 24. Less than 1 km from shore, shelf depths exceed 10m, and significantly deeper waters (>100 m) are not far away. Twice each year (January and July) for two years, working from Barrow, we will use either small boat or skidoo to travel offshore to sample seawater. We anticipate having access to surface waters of 10-20 m depth within a mile of the town of Barrow. We plan to sample biological and biogeochemical inventories along three offshore transects, with 3-5 depths that sample through the surface mixed layer and into the subsurface layer, accessing both the eastward coastal and the offshore westward currents (Weingartner 2006). More extensive rate measurements and incubation studies will be made at selected sites and depths The rationale for the transects is to sample the microbial community response to the cross-shelf and depth gradients DIN availability. Nearshore stations will be N-limited throughout the water column in the summer. Offshore stations may have significant NO3 below summer stratification. As part of SNACS (Study of the Northern Alaska Coastal) C. Ashjian and colleagues have recently completed summer research near Barrow, using small (43') boats to investigate environmental controls on zooplankton populations. They will have nutrient profiles offshore, which will help guide our study. During the summer, we will coordinate with native Inupiat subsistence whalers (Barrow Whaling Captain Association. In the winter, safe travel over the ice by foot or snow machine, as far out as the nearshore lead, will offer access to the ocean using an ice auger. We will not be able to sample far offshore during winter, but gradients will be weaker due to mixing.

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Project Information

Does competition for nitrogen between autotrophs and heterotrophs control carbon fluxes in the western coastal Arctic? (ArcticNITRO)

Website: http://arcticnitro.org

Coverage: Nearshore Arctic Ocean; Barrow, Alaska; 71.25-71.50N, 156-157W

The Arctic is changing. Warm air is melting the sea ice at an accelerating pace, impacting the marine ecosystem. Further changes on land mean higher river discharge, rising seas, thawing of permafrost, and coastal erosion.

For the Arctic continental shelf, these physical changes impact the creatures that live there in major ways, ultimately altering the pathways and magnitude of energy transfer to fish, sea birds and marine mammals, and impacting the people dependant on those resources. Our challenge today is to understand what is happening in specific Arctic ecosystems to assess future change.

Understanding the microorganisms in Arctic coastal ecosystems is important because microbes dominate the biological biomass, production, and remineralization in marine systems. They are the "composters." Microbes are also the major producers and consumers of carbon dioxide and other greenhouse gases.

This study is focused on the climate-sensitive relationship between these microbes -- particularly the competition for nitrogen between phytoplankton/algae and bacteria -- and the productivity of the food web that depends on these organisms.

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Funding

Funding Source	Award
NSF Arctic Sciences (NSF ARC)	PLR-0909839
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