Water Column Chemical and Biological Inventories from the Arctic Ocean from 2010-2012 (ArcticNITRO project)

Website: https://www.bco-dmo.org/dataset/535715
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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

Water Column Chemical and Biological Inventories

AMBIENT = Water column inventories

Methods & Sampling

(tbd)

Data Processing Description

BCO-DMO Processing Notes
- Generated from original file "ARCTICNITRO_MasterlDataReport.xlsx, sheet: "Ambient" contributed by Patricia Yager
- Date reformatted to YYYYMMDD
- Lat/Lon degs, mins, secs converted to decimal degrees
- Parameter names edited to conform to BCO-DMO naming convention found at Choosing Parameter Name
- "nd" (no data) inserted into blank cells

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Data Files

File
MasterData_Ambient.csv (Comma Separated Values (.csv), 21.45 KB) MD5:9d7dabb33541184bd0f3a6a2421d144b Primary data file for dataset ID 535715

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Parameters

Parameter	Description	Units
Year	Collection Year	YYYY
Station_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
Water_Depth	Station Water Depth	meters
Ice_Thickness	Ice Thickness	meters
Snow_Thickness	Snow Thickness	centimeters
Surface_Water_Temp	Surface Water Temp	degrees Celsius
Sample_ID	Sample Unique Identifier	text
Sample_Depth	Sample Depth	meters
CTD_Water_Temperature	CTD Water Temperature	degrees Celsius
CTD_Salinity	CTD Salinity	PSU

CTD_Dissolved_Oxygen	Water column dissolved oxygen from CTD depth profile	mg/l
CTD_Dissolved_Oxygen_Saturation	Water column % oxygen saturation from CTD depth profile	percentage
CTD_pH	Water column pH from CTD depth profile	pH Units
CTD_Relative_Turbidity	Water column turbidity from CTD depth profile	NTU
CTD_Chla_Fluorescense	Fluorometer from CTD depth profile	umol C/L
Ambient_Total_Dissolved_Nitrogen	Water column total dissolved nitrogen	umol N/L
Ambient_Total_Dissolved_Nitrogen_SD	Water column total dissolved nitrogen SD	dimensionless
Ambient_Ammonium	Water column NH4 concentration	umol N/L
Ambient_Ammonium_SD	Water column NH4 concentration SD	dimensionless
Ambient_Nitrite	Water column NO2 concentration	umol N/L
Ambient_Nitrite_SD	Water column NO2 concentration SD	dimensionless
Ambient_Nitrate	Water column NO3 concentration	umol N/L
Ambient_Nitrate_SD	Water column NO3 concentration SD	dimensionless
Ambient_Dissolved_Organic_Nitrogen	Water column total dissolved organic nitrogen	umol N/L
Ambient_Dissolved_Organic_Nitrogen_SD	Water column total dissolved organic nitrogen SD	dimensionless
Ambient_Urea	Water column urea concentration	umol N/L
Ambient_Urea_SD	Water column urea concentration SD	dimensionless
Ambient_Dissolved_Primary_Amines	Water column dissolved primary amine	umol N/L

Ambient_Dissolved_Primary_Amines_SD	Water column dissolved primary amine SD	dimensionless
Ambient_Dissolved_Organic_Carbon	Water column dissolved organic carbon	umol C/L
Ambient_Dissolved_Organic_Carbon_SD	Water column dissolved organic carbon SD	dimensionless
Ambient_Phosphate	Water column PO4 concentration	umol P/L
Ambient_Phosphate_SD	Water column PO4 concentration SD	dimensionless
Ambient_Silicate	Water column Si concentration	umol Si/L
Ambient_Silicate_SD	Water column Si concentration SD	dimensionless
Total_Dissolved_Phosphate	Water column dissolved phosphorous	umol P/L
Total_Dissolved_Phosphate_SD	Water column dissolved phosphorous SD	dimensionless
Dissolved_Organic_Phosphate	Water column dissolved organic phosphorous	umol P/L
Chlorophyll_a	Chl a concentration	ug/L
Chlorophyll_a_SD	Chl a concentration SD	dimensionless
Bacterial_Abundance	Flow cytometer counts using CYBR gold	cells/mL
Bacterial_Abundance_SE	Flow cytometer counts using CYBR gold SE	dimensionless
AVE_Bacterial_Production	Leucine incorporation rates per liter per hour	pmol Leu / L / h
AVE_Bacterial_Production_SD	Leucine incorporation rates per liter per hour SD	dimensionless
Whole_Community_Respiration	Whole community respiration from time series increases in DIC	umol O L-1 hr-1

nasA_gene_abundance	Gene abundance of bacterial nitrate reducase genes	gene copy L-1
nasA_gene_abundance_SD	Gene abundance of bacterial nitrate reducase genes SD	dimensionless
nasA_transcript_abundance	Normalized gene expression rates of bacterial nitrate reductase	transcript copy/ng total RNA L-1

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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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