

CTD station locations from R/V Clifford A. Barnes cruises CB916, CB921, CB924, CB928, CB933, CB944 from the Hood Canal, East Sound; 2008-2010 (Marine Nitrogen Cycle project)

Website: <https://www.bco-dmo.org/dataset/3450>

Version: 22 March 2011

Version Date: 2011-03-22

Project

» [Quantifying the role of Group I Crenarchaeota in the marine nitrogen cycle using cultures and environmental monitoring of ammonia oxidation, 16S rRNA genes and lipid biomarkers](#) (Marine Nitrogen Cycle)

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Dataset Description

Cruise, dataset, station, date, time, lat, lon for the CTD stations

Methods & Sampling

Generated by BCO-DMO staff from .cnv files and file Ingalls_HC_Data for NODC.xls, sheet Meta Data

Data Processing Description

Generated by BCO-DMO staff from .cnv files and file Ingalls_HC_Data for NODC.xls, sheet Meta Data

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Data Files

File
CTD_Stations.csv (Comma Separated Values (.csv), 1.36 KB) MD5:77268acd7a018d52bd2134e7199b4042
Primary data file for dataset ID 3450

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Parameters

Parameter	Description	Units
Station	Station number	text
Date	date (GMT)	YYYYMMDD
Time	time (GMT)	HHMMSS
Longitude	Station longitude (West is negative)	decimal degrees
Latitude	Station latitude (South is negative)	decimal degrees
Dataset	CTD dataset id	text
Cruise	Cruise Id	text

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Deployments

CB916

Website	https://www.bco-dmo.org/deployment/58652
Platform	R/V Clifford A. Barnes
Start Date	2008-04-29
End Date	2008-05-01
Description	Using the R2R Cruise Id

CB921

Website	https://www.bco-dmo.org/deployment/58653
Platform	R/V Clifford A. Barnes
Start Date	2008-08-18
End Date	2008-08-21
Description	NOTE: CTD data list cruise id as CAB920 R2R Catalog lists cruise id as CB921 with Anitra Inglas as the Chief Sci Using the R2R Cruise Id

CB924

Website	https://www.bco-dmo.org/deployment/58654
Platform	R/V Clifford A. Barnes
Start Date	2008-10-06
End Date	2008-10-08
Description	Using the R2R Cruise Id

CB928

Website	https://www.bco-dmo.org/deployment/58655
Platform	R/V Clifford A. Barnes
Start Date	2008-12-08
End Date	2008-12-11
Description	NOTE: CTD data list cruise id as CAB927 R2R Catalog lists cruise id as CB928 with Anitra Inglas as the Chief Sci Using the R2R Cruise Id

CB933

Website	https://www.bco-dmo.org/deployment/58656
Platform	R/V Clifford A. Barnes
Start Date	2009-05-11
End Date	2009-05-15
Description	Using the R2R Cruise Id

CB944

Website	https://www.bco-dmo.org/deployment/58657
Platform	R/V Clifford A. Barnes
Start Date	2010-07-06
End Date	2010-07-08
Description	Using the R2R Cruise Id

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Project Information

Quantifying the role of Group I Crenarchaeota in the marine nitrogen cycle using cultures and environmental monitoring of ammonia oxidation, 16S rRNA genes and lipid biomarkers (Marine Nitrogen Cycle)

Coverage: Hood Canal, Puget Sound, Washington

Project Summary

Recent advances in molecular microbial ecology have overturned canonical paradigms of the marine nitrogen cycle. Estimates of global nitrogen fixation are regularly revised upward, the non-traditional bacterial denitrification pathway known as anammox is now thought to be responsible for a significant portion of global denitrification, and the discovery of ammonia-oxidizing *Archaea* necessitates a reevaluation of the contribution of traditional nitrifying bacteria to the global nitrogen cycle. While environmental gene sequencing and geochemical studies were critical to these discoveries, much of our understanding could not have been gained without the aid of studies on representative organisms in pure culture. Since their discovery in 1992, the ecological role of mesophilic marine *Archaea* has remained a mystery due in large part to the lack of a cultured representative.

We now have a mesophilic marine *Crenarchaea* in culture along with several lines of evidence that this and many other pelagic marine *Crenarchaea* oxidize ammonia to obtain the energy needed to sustain autotrophic carbon fixation. The distribution of marine *Crenarchaea* and their genes encoding ammonia-oxidizing enzymes, suggests that these organisms are responsible for the oxidation of a significant portion of the ocean's reduced nitrogen pools.

Here we propose to begin to better understand the physiological capabilities, distribution and quantitative significance of ammonia-oxidizing *Crenarchaea*. Our group is uniquely positioned to launch a comprehensive set of studies that will use cutting edge techniques to answer the following questions:

- 1) What factors control the rate and efficiency of *Archaeal* ammonia-oxidation?
- 2) What is the relative role of *Bacteria* and *Archaea* in ammonia-oxidation in the marine environment?
- 3) How can biomarkers be used to detect and assess the physiological status of living ammonia-oxidizing *Bacteria* and *Archaea*?

Our study uniquely combines culture work, molecular biology, organic geochemistry and field investigations into one of the first studies of the role of marine *Crenarchaea* in the biogeochemical cycling of nitrogen.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0623174

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