

Home

About IR

Journals

MEPS

AB

AEI

► AME

AME Home

Most Recent Issue

About the Journal

Editors

AME Forthcoming

AME Specials

CR

DAO

ESEP

ESR

SEDAO

Guidelines For Authors

Editorials

Subscription Information 2017

Subscription Information 2018

Terms of Use

Open Access

Contents Mailing Lists

Rights & Permissions

Promotional Posters

Book Series

Ecology Institute

Otto Kinne Foundation

Job Openings

For librarians

Search:

Go

You are at: [Inter-Research](#) > [AME](#) > [v79](#) > [n3](#) > [p273-286](#)

AME 79:273-286 (2017) - DOI: <https://doi.org/10.3354/ame01834>

Regional patterns in ammonia-oxidizing communities throughout Chukchi Sea waters from the Bering Strait to the Beaufort Sea

Julian Damashek^{1,2,**}, Kade P. Pettie^{1,3,**}, Zachary W. Brown^{1,4}, Matthew M. Mills¹, Kevin R. Arrigo¹, Christopher A. Francis^{1,*}

¹Department of Earth System Science, Stanford University, Stanford, CA 94305, USA

²Present address: Department of Marine Sciences, University of Georgia, Athens, GA 30602, USA

³Present address: Department of Biology, Stanford University, Stanford, CA 94305, USA

⁴Present address: Inian Islands Institute, Gustavus, AK 99826, USA

*Corresponding author: caf@stanford.edu

**These authors contributed equally to this study

ABSTRACT: The shallow Chukchi Sea is a highly productive region of the Arctic Ocean, fed by Pacific water transported north through the Bering Strait. Nitrification in Chukchi Sea bottom waters oxidizes significant amounts of regenerated ammonium, which increases the pool of nitrate available for denitrification and changes the nutrient balance of this water prior to export to the Canada Basin. However, little is known about the ammonia-oxidizing microbial communities in Chukchi Sea waters. We used quantitative polymerase chain reaction assays to determine the abundance and transcriptional activity of both ammonia-oxidizing *Archaea* (AOA) and ammonia-oxidizing *Bacteria* (AOB) along coastal Chukchi Sea bottom waters, as well as waters of Atlantic-origin over the Beaufort slope. While AOA significantly outnumbered AOB in deeper Beaufort slope waters, AOB were more abundant at most coastal stations, potentially due to a greater concentration of regenerated ammonium trapped in coastal bottom waters. Quantification of 2 marine AOA ecotypes, Water Column A (WCA) and Water Column B (WCB), showed a surprisingly high abundance of WCB, generally considered a deep-water ecotype, in shallow coastal waters as well as deep slope waters, likely due to transport via shelfbreak upwelling. Transcript abundances also suggested WCA and WCB in coastal waters were transcriptionally active at comparable levels. The relatively high abundance of AOB and WCB suggests the Chukchi Sea has unique ammonia-oxidizing communities compared to most shallow coastal oceans, highlighting the importance of regional biogeochemical processes (ammonium regeneration) and physical processes (upwelling) in structuring coastal microbial communities.

KEY WORDS: *Thaumarchaeota* · Ammonia oxidizers · Arctic · Ammonium · Ecotypes · Nitrification

 Full text in pdf format

 Supplementary material

 Previous

 Cited by

Cite this article as: Damashek J, Pettie KP, Brown ZW, Mills MM, Arrigo KR, Francis CA (2017) Regional patterns in ammonia-oxidizing communities throughout Chukchi Sea waters from the Bering Strait to the Beaufort Sea. *Aquat Microb Ecol* 79:273-286. <https://doi.org/10.3354/ame01834>

Export citation

 Mail this link - Contents Mailing Lists - RSS

- Tweet -  Share

Published in *AME Vol. 79, No. 3*. Online publication date: July 05, 2017

Print ISSN: 0948-3055; Online ISSN: 1616-1564

Copyright © 2017 Inter-Research.