

Author's Accepted Manuscript

Formation and transport of corrosive water in the Pacific Arctic region

Jessica N. Cross, Jeremy T. Mathis, Robert S. Pickart, Nicholas R. Bates



www.elsevier.com/locate/dsr2

PII: S0967-0645(18)30123-1

DOI: <https://doi.org/10.1016/j.dsr2.2018.05.020>

Reference: DSR14451

To appear in: *Deep-Sea Research Part II*

Cite this article as: Jessica N. Cross, Jeremy T. Mathis, Robert S. Pickart and Nicholas R. Bates, Formation and transport of corrosive water in the Pacific Arctic region, *Deep-Sea Research Part II*, <https://doi.org/10.1016/j.dsr2.2018.05.020>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Formation and transport of corrosive water in the Pacific Arctic region

Jessica N. Cross^{a*}, Jeremy T. Mathis^b, Robert S. Pickart^c, Nicholas R. Bates^{d,e}

^aPacific Marine Environmental Laboratory, National Oceanic and Atmospheric Administration, OERD-3, 7600 Sand Point Way NE, Seattle, WA 98115 USA, Jessica.Cross@NOAA.gov

^bArctic Research Program, NOAA Office of Ocean and Atmospheric Research, 1315 East West Hwy, Silver Spring, MD 20910-3282, USA, Jeremy.Mathis@NOAA.gov

^cWoods Hole Oceanographic Institution, 266 Woods Hole Rd., MS# 21, Woods Hole, MA 02543-1050, USA, RPickart@WHOI.edu

^dBermuda Institute of Ocean Sciences, 17 Biological Station, Ferry Reach, St. George's GE 01, Bermuda, Nick.Bates@BIOS.edu

^eUniversity of Southampton, Department of Ocean and Earth Science, National Oceanography Centre, Southampton, UK

Key Words: Ocean Acidification; Pacific Arctic; Arctic Ocean; East Siberian Sea; Chukchi Sea; Beaufort Sea; Transport; Arctic Rivers; Sea Ice; Respiration; Upwelling; Biological Vulnerability; Community Resilience

Abstract:

Ocean acidification (OA), driven by rising anthropogenic carbon dioxide (CO₂), is rapidly advancing in the Pacific Arctic Region (PAR), producing conditions newly corrosive to biologically important carbonate minerals like aragonite. Naturally short linkages across the PAR food web mean that species-specific acidification stress can be rapidly transmitted across multiple trophic levels, resulting in widespread impacts. Therefore, it is critical to understand the formation, transport, and persistence of acidified conditions in the PAR in order to better understand and project potential impacts to this delicately balanced ecosystem. Here, we synthesize data from process studies across the PAR to show the formation of corrosive conditions in colder, denser winter-modified Pacific waters over shallow shelves, resulting from the combination of seasonal terrestrial and marine organic matter respiration with anthropogenic CO₂. When these waters are subsequently transported off the shelf, they acidify the Pacific halocline. We estimate that Barrow Canyon outflow delivers ~2.24 Tg C yr⁻¹ to the Arctic Ocean

Download English Version:

<https://daneshyari.com/en/article/10223806>

Download Persian Version:

<https://daneshyari.com/article/10223806>

[Daneshyari.com](https://daneshyari.com)