

Monitoring the Western Arctic Boundary Current in a warming climate

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Research Expedition Details

Dates: November 1 – December 3, 2022

Departs from: Nome, AK

Returns to: Seward, AK

Research Area Location: Chukchi Sea; Alaskan and Canadian Beaufort Seas

Vessel: R/V Sikuliaq

Research website: <http://aon.who.edu/>

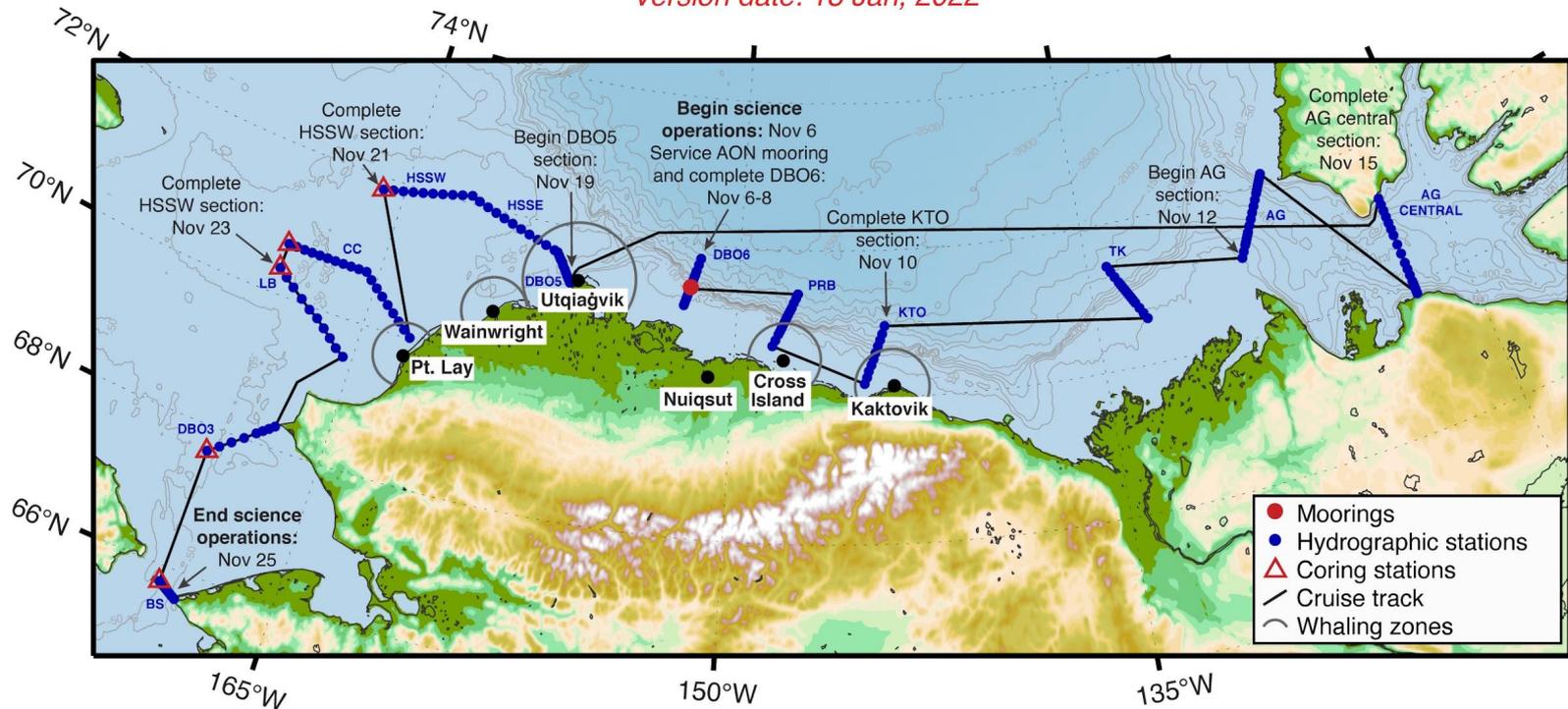
Project supported by: National Science Foundation

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RV Sikuliaq cruise SKQ2022-15s

Depart Nome: 1 Nov, 2022 - Arrive Seward: 3 Dec, 2022

Version date: 18 Jan, 2022



Key Scientific Questions & Motivations

- What dictates the strength of the Western Arctic Boundary Current and how does it change from year to year?
- What is lateral exchange of water and properties across the current and how is this affected by storms, current instabilities, and ice cover?
- What are the impacts of the exchange on the ecosystem, including marine mammal occurrence on the shelf and slope?

Key Activities & Data to be collected

Our approach is to use a sub-surface mooring deployed in the center of the boundary current throughout the year, and shipboard measurements in summer/fall. We also support ancillary programs who desire access to the region.

Shipboard measurements include:

- CTD casts
- water sampling from the rosette (nutrients; oxygen; $\delta^{18}\text{O}/\delta^{17}\text{O}/\delta^2\text{H}$; Pseudo-nitzschia and Alexandrium abundance; chlorophyll; molecular quantities; salinity)
- van Veen grabs
- sediment cores (multi-cores, gravity cores)
- underway sampling of surface seawater (oxygen; argon; $\delta^{18}\text{O}$ and $\delta^2\text{H}$; Imaging Flow Cytobot)
- underway sampling of marine air ($\delta^{18}\text{O}/\delta^{17}\text{O}/\delta^2\text{H}$)
- nitrogen fixation incubations

Implications & Broader Impacts

Wind-driven exchange occurs frequently along the Beaufort slope.

Upwelling: causes heat and freshwater discharge into the basin; fuels late-season phytoplankton blooms; influences whale feeding patterns.

Downwelling: is one of the main mechanisms for ventilating the cold halocline.

Decreased ice concentration and increased storm activity due to climate change will enhance these processes. This project will help us understand the associated impacts. It will also help us understand the far-field consequences of changes in the Bering Strait inflow.

Potential Areas of Collaboration

Is there available berth space? Yes, one available berth

Is there space for other equipment and/or to collect data for other teams?

Yes

Can you make your data available for other teams to collaborate on? And how?

Data from the AON program are immediately made public, archived at the Arctic Data Center and WHOI's

AON website <http://aon.who.edu/>

Opportunities to work with Indigenous and local communities?

We are doing outreach on the cruise with teachers from different parts of the country, including rural AK. We are working with a local community observer during the fieldwork