

Losing its cool: Will ice melt heat up naval operations in Arctic Ocean?

1 November 2016



Researchers prepare to drop a buoy into the Arctic Ocean. Scientists sponsored by the Office of Naval Research have traveled to the region to study the changing environment-and provide new tools to help the US Navy operate in a once-inaccessible area. Credit: Jim Thomson from the University of Washington/Applied Physics Laboratory

As diminishing sea ice in the Arctic Ocean expands navigable waters, scientists sponsored by the Office of Naval Research (ONR) have traveled to the region to study the changing environment—and provide new tools to help the U.S. Navy operate in a once-inaccessible area.

"This changing environment is opening the Arctic for expanded maritime and naval activity," said Rear Adm. Mat Winter, chief of naval research. "Developing a deeper understanding and knowledge of this environment is essential for reliable weather and ice predictions to ensure the safety of future scientific and operational activities in the region."

A recent announcement from the National Snow and Ice Data Center revealed that 2016's sea ice

minimum—the annual measurement of when sea ice hits its lowest point— tied with 2007 for the second-lowest ice minimum since satellite monitoring began in the 1970s. The lowest minimum ever occurred in 2012.

ONR sponsored its scientific research through two initiatives within its Arctic and Global Prediction Program—Marginal Ice Zone, and Waves and Sea State. Additional research involved the program's CANada Basin Acoustic Propagation Experiment (CANAPE) initiative.

Scientists measured the strength and intensity of waves and swells moving through the weakened Arctic sea ice. The accumulated data will be used to develop more accurate computer models and prediction methods to forecast ice, ocean and weather conditions.

CANAPE researchers used sophisticated oceanographic and acoustic sensors to gauge temperature, salinity, ice and ambient noise conditions under the surface of the ice and water—factors that can dramatically impact the effectiveness of sonar operations and antisubmarine warfare.

"Abundant sea ice reduces waves and swells and keeps the Arctic Ocean very quiet," said Dr. Robert Headrick, an ONR program officer overseeing the CANAPE research. "With increased sea ice melt, however, comes more waves and wind, which create more noise and makes it harder to track undersea vessels. The goal of CANAPE is to gain a better and more comprehensive understanding of these changing oceanographic conditions."

Because of its thick shield of sea ice, the Arctic historically has had limited naval strategic relevance beyond submarine operations. But as this frozen cover changes, it is opening new commercial shipping lanes; increasing oil and natural gas exploration, fishing and tourism; and

raising potential new security concerns. It also may create new requirements for the Navy's surface fleet.

"Having accurate forecasting models will help the Navy determine what types of surface vessels it will need to build in the near future and 30 years from now, to withstand the climate conditions," said Dr. Scott Harper, an ONR program officer overseeing the Marginal Ice Zone and Waves and Sea State research. "That way, the Navy can operate as safely and effectively in the Arctic as it does throughout the rest of the world."

Watch a video about ONR-sponsored research in the Arctic Ocean.

Provided by Office of Naval Research

APA citation: Losing its cool: Will ice melt heat up naval operations in Arctic Ocean? (2016, November 1) retrieved 19 September 2021 from <https://phys.org/news/2016-11-cool-ice-naval-arctic-ocean.html>

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