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Presentation Type: In Person, Oral

Topic: Recent ocean salinity science advances

Title: Surface Salinity Controls Upper-Ocean Stratification in Open Waters of the Arctic Ocean

Abstract: The Arctic Ocean is warming and sea ice extent has declined for decades. The Arctic receives ~ 11% of the global freshwater via rivers, some portion of which is frozen into sea ice each autumn. The role that freshwater has in stratifying the surface ocean insulating the air-sea interface from warm water trapped below the mixed layer is examined using a series of in situ observations of temperature, salinity, and pressure collected during a 2022 expedition into the Beaufort Sea. We show that freshwater at the surface sets upper-ocean stratification, preconditioning the ocean's surface to freeze when atmospheric conditions allow. Our analysis also revealed in Arctic conditions, sea surface salinity can be used to approximate surface density. This inference regarding the stratifying role salinity has in the Arctic can be used to develop remote-sensing proxies for surface stratification of open water in the Arctic using satellite measurements of sea surface salinity alone.

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