

Tracing Antarctic snow's chemical and biological properties in the air-polar ocean exchange

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Snow is a crucial component of the Antarctic cryosphere, contributing to the continent's ice mass and radiative properties, thus playing a role in regulating the Earth's climate. In addition, snow is a vital precipitation mechanism connecting the polar troposphere and the polar ocean through atmospheric wet deposition. The elemental flux potentially affects biogeochemical cycles in the Southern Ocean and thus globally. However, the question of how and to what extent Antarctic snow contributes to the polar ocean's air-sea exchange and chemical-biological interactions is unresolved at this point. To explore answers to this question, we worked on a set of fresh surface snow samples collected around the U.S. Palmer Station, on the western Antarctic Peninsula, a rapidly-warming region of the continent. We applied multiple analytical approaches to extract chemical and biological signatures from snow samples. In this presentation, we will share preliminary data on ionic species, trace elements, organics and water oxygen isotopes, which could serve as a closure experiment for Antarctic snow, helping to advance understanding of the roles of Antarctic snow in the polar ocean.