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Arctic shelves as platforms for biogeochemical activity: nitrogen and carbon transformations in the Chukchi Sea, Alaska

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Abstract

Continental shelves comprise <5% of global ocean area but may account for a disproportionate 30% of primary production, 80% of organic matter burial, and >50% of marine denitrification. The Hanna Shoal region, part of the continental shelf system in the northeast Chukchi Sea, Alaska, is recognized for its high biodiversity and productivity. We investigated the role of sediments in organic matter decomposition and nutrient cycling at five stations on the shallow Hanna Shoal. In particular, we asked (1) how much sediment organic matter is remineralized in the Chukchi Sea, and what factors drive this degradation, (2) do sediments function as a net source for fixed nitrogen (thus fueling primary production in the overlying water), or as a net sink for fixed nitrogen (thereby removing it from the system), and (3) what is the balance between sediment NH_4^+ uptake and regeneration, and what factors drive NH_4^+ cycling? We conducted dark sediment core incubations to measure sediment O_2 consumption,

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