

## **Is boundary scavenging the missing sink of Arctic protactinium-231?**

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The naturally occurring radioactive isotopes protactinium-231 and thorium-230 are frequently used to reconstruct paleo-oceanographic circulation patterns; the slightly lower particle reactivity of Pa-231 compared to Th-230 allows this isotope to be preferentially affected by advection, resulting in lower Pa-231/Th-230 ratios in sediments in areas with substantial deep water advection. In the Arctic, these tracers can be applied to investigate the persistence of Arctic deep water export to the Atlantic, which contributes to the formation of North Atlantic Deep Water, an important component of thermohaline circulation. However, balanced sedimentary budgets of Pa-231 in the Arctic have been difficult to achieve due to “missing” Pa-231 in the central basins. To investigate the role of boundary scavenging as a potential sink for Pa-231, we have expanded the coverage of Pa-231/Th-230 measurements in coretop sediments around the Arctic, with a particular focus on margin areas. Based on these measurements we present an updated budget for Pa-231 in the modern Arctic Ocean and assess the utility of the Pa-231/Th-230 ratio as a paleo-proxy for Arctic deep water export.