# Cenozoic Nedoymium Isotope Evolution of Arctic Ocean Deep Water

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We present the first Nd isotope record of Arctic seawater obtained from leaching of metal-oxide coatings of bulk sediments from the ACEX sediment cores drilled as a part of IODP on the Lomonosov Ridge in the central Arctic Ocean. The ACEX cores provide the first record of Arctic Ocean sedimentation covering most of the Cenozoic, and show that detrital sediments have dominated the most recent 14 Ma, deposited above a condensed section spanning the period from ~14 and 45 Ma. The oldest section begins at ~55 Ma and is composed of organic-rich siliciclastic sediments (Moran et al., submitted to Nature).

The Nd isotopic signal of the leaches is argued to be a robust recorder of the ambient Arctic bottom water Nd isotopic composition from a comparison of core top data to direct seawater measurements (typical εNd of Arctic core top sediment leachates is ~-10.5, compared with measured deep water εNd of ~-11; Andersson, Porcelli, Frank et al., unpublished). This is critical, as the Arctic sediments in the upper 200 m are essentially barren of other authigenic phases - such as carbonates - from which seawater Nd could potentially be extracted.

Results for the period from ~20 Ma to present were readily produced. Sampling resolution was generally low (Myr) with the exception of sections showing distinct, most likely glacial/interglacial, cyclicities during the Late Quaternary, where sampling was increased to kyr resolution. Paleocene-Eocene sediments proved to be difficult to clean and leach due to their high organic content, and measurements were not carried out in the condensed Eocene-Oligocene section

We found pronounced Nd isotopic variations on glacial-interglacial cycles in the Quaternary Arctic Ocean (εNd ranges from ~-7.5 to ~-10.5, respectively). The amplitude of the εNd signal on the million year time scale is similar, with maxima at ~-6 and minima at ~-8.5. These data allow us to put initial constraints on past weathering fluxes to the Arctic Ocean (on both million year and glacial/interglacial time scales). The Nd isotope data also reflect the mixing of Arctic and global deepwater, through evolving ocean gateways. We will assess the impact of Arctic Ocean water mass exchange on global circulation as seen through comparison the Arctic εNd record with Atlantic and Pacific Ocean data.