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## Nitrogen isotopic inventory of the Lena River Delta

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Permafrost-affected soils around the Arctic Ocean contain a large reservoir of organic matter including nitrogen, which partly reach the river after thawing, degradation and erosion of permafrost. After mobilization, reactive remineralised nitrogen is either used for primary production, microbial processing or is simply transported to coastal waters. With analyzing the natural abundance of the stable isotope composition in different form of nitrogen components, we aim to unravel the balance of transport and biological nitrogen turnover processes like remineralization or nitrification and in consequent the fate of the nitrogen.

We have analyzed soil, suspended matter and dissolved inorganic and organic nitrogen for their contents and <sup>15</sup>N stable isotope composition to create a baseline for a nitrogen inventory of the Lena River Delta in 2019/2020. We used samples from two transect cruises through the delta in March and August 2019, a monitoring program at Samoylov Island in the central delta (2019/2020), and different soil type samples from Samoylov and Kurunghak Island. Our aim was to determine nitrogen sources, sinks and transformation processes during transport in river and delta.

Our data shows that in winter the nitrogen transported from the delta to the Laptev Sea were dominated by dissolved organic nitrogen (DON) and nitrate, which occur in similar amounts of approx. 10 µmol/L. The load of nitrate, during the transect cruise, increased slightly in the delta, while we observed no changes to the isotope values of DON and nitrate indicating a lack of biological activity in the winter season and the lateral transport from soils was the likely source. In summer, nitrogen was mainly transported as DON and particulate nitrogen in the suspended matter and nitrate was mainly below 1 µmol/L.

The nitrogen stable isotope values of the different nitrogen components ranges between 0.5 and 4.5‰, and were subsequently enriched from the soils via suspended particulate matter (SPM)/sediment and DON to nitrate. These light values indicate soil nitrogen mainly originates from atmospheric nitrogen fixation. During transport and remineralization, biogeochemical recycling via nitrification and assimilation by phytoplankton led to an isotopic enrichment in

summer. In the coastal waters of the Laptev Sea, the exported river waters are slowly mixed with marine nitrate containing waters from the Arctic Ocean, and a part of the riverine organic nitrogen is buried in the sediments.

Our data provides a baseline for isoscape analysis and can be used as an endmember signal for modeling approaches.