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Characteristics of organic carbon in surface sediments of Laptev Sea shelf

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Accelerating coastal erosion and enhancing river sediment discharge are expected to greatly increase the delivery of terrestrial organic carbon (terrOC) to the Arctic Ocean. Remobilized terrOC may be buried in shallow or outer shelf sediments, degraded and translocated to the deeper basins, or remineralized in the water column causing a positive feedback to amplified global warming. The East Siberian Arctic Shelf (ESAS), represented by the Laptev Sea, the East Siberian Sea, and the Russian part of the Chukchi Sea, is the widest and shallowest continental shelf of the World Ocean. In the current study, we investigated surface sediment samples collected across the Laptev Sea shelf (from the coastline to the outer shelf) during the Arctic expedition onboard the Russian *R/V Academician M. Keldysh* during fall 2018.

We analyzed 16 samples for bulk (TOC, δ13C) and molecular (distribution and concentration of n-alkanes and PAHs) parameters. We also performed Rock-Eval (RE) analysis in order to compare its results with the signatures provided by traditional geochemical tracers and thereby to gain new insights into the sources of organic matter in modern surface sediments. In addition, a grain-size analysis was carried out to reveal hydrodynamic control on the organic carbon transport across the studied transect. Using a combination of traditional molecular interpretations (performed in this study and published earlier) and RE parameters (Hydrogen index, Oxygen index and T_{peak}) we attempted to distinguish riverine input and coastal erosion and disentangle processes of terrOC degradation and its replacement with fresh/marine OC during cross-shelf transport. Overall, a strong decrease of terrigenous contribution to the sedimentary organic carbon was observed on molecular level with increasing distance from the coast. According to the RE data, intensive terrOC degradation takes place in the shallow and mid-shelf sediments which is traced by sharply increasing oxygen index. The clear correlation between OI and the clay content points toward the perception that mineral matrix do not seem to be such good protector as expected, and intensive microbial degradation of the sedimentary organic matter contained in fine particles occurs during repeated resuspension.

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