EGU23-14978, updated on 21 Aug 2023
https://doi.org/10.5194/egusphere-egu23-14978
EGU General Assembly 2023

Cross-Shelf Transport, Composition and Degradation of Terrestrial Permafrost Organic Matter at the Sediment-Water Interface in the Laptev and East Siberian Seas

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The ongoing rise of atmospheric temperatures and sea level is exacerbating Arctic coastal permafrost thaw which leads to increased coastal erosion and input of permafrost soils into the Arctic Ocean. Permafrost soils hold vast amounts of organic carbon (OC) which is released into the coastal waters upon thawing. The fate of this OC with regards to its transport and degradation pathways is not yet fully understood - it could either be degraded within the water column and released into the atmosphere as CO2 or it could be buried at the sea floor. When settling onto the seafloor sediment-water interactions become crucial in the OC degradation process. These so-called flocculation layers at the sediment-water interface hold a high potential for sediment re-suspension and therefore represent an environment favouring the degradation of OC thus preventing burial. Yet, there is little data available from these flocculation (i.e. nepheloid) layers, particularly in the Arctic shelf seas.

To improve our understanding of OC degradation within these flocculation layers, we analysed samples from the flocculation layer and from the underlying surface sediments for organic geochemical parameters (TOC, C/N values, δ13C, Δ14C, sediment surface area). Samples within this study were collected along two cross-shelf transects in the Laptev and in the East Siberian Sea during ISSS-2020 expedition in late summer (Sept-Oct) of 2020 onboard *R/V Akademik Msistlav Keldysh*. First results show variations in OC composition in both shelf seas between the flocculation and surface sediment layers and also with increasing water depth and distance from shore, further emphasizing the degradation potential of this particular layer. With the collected data, we want to gain new insights into how transport and degradation processes of terrestrial OC

vary across the vast Siberian shelves.