



Landscape-level soil profile inventories of soil organic matter with emphasis on cryoturbation in three regions of continuous permafrost (Zackenberg, Greenland; Taymyr Peninsula, Siberia; and Eastern Siberia)

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The northern circumpolar permafrost region occupies about 16% of the global soil area and holds approximately 50% of the global soil organic carbon (SOC). We here describe the quantity and quality of soil organic matter (SOM) in three regions of continuous permafrost with an emphasis on the importance of cryoturbation for SOC storage. This study is based on landscape-level soil profile inventories to 1 m depth in five different study sites: Zackenberg (Greenland), Ary-Mas and Logata (Taymyr Peninsula, Siberia) and Shalauovo and Chersky (Eastern Siberia). SOC storage and SOM composition is assessed using soil chemical, elemental and radiocarbon dating analysis. The estimated mean SOC storage for the top meter in Zackenberg is 8.3 kg C m⁻² in comparison to 27.6 kg C m⁻², 31.3 kg C m⁻², 30.0 kg C m⁻², 20.3 kg C m⁻² in Ary-Mas, Logata, Shalauovo and Chersky, respectively. Differences can largely be explained by poorly developed soils in the mountainous area of Zackenberg, but the quantity and distribution of buried, i.e. cryoturbated organic matter and the occurrence of SOC-rich peatland soils (fens and bogs) are also important factors.