

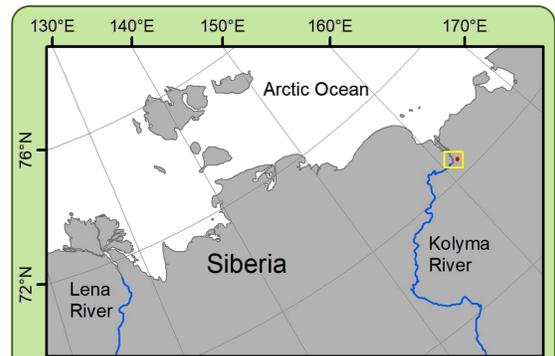
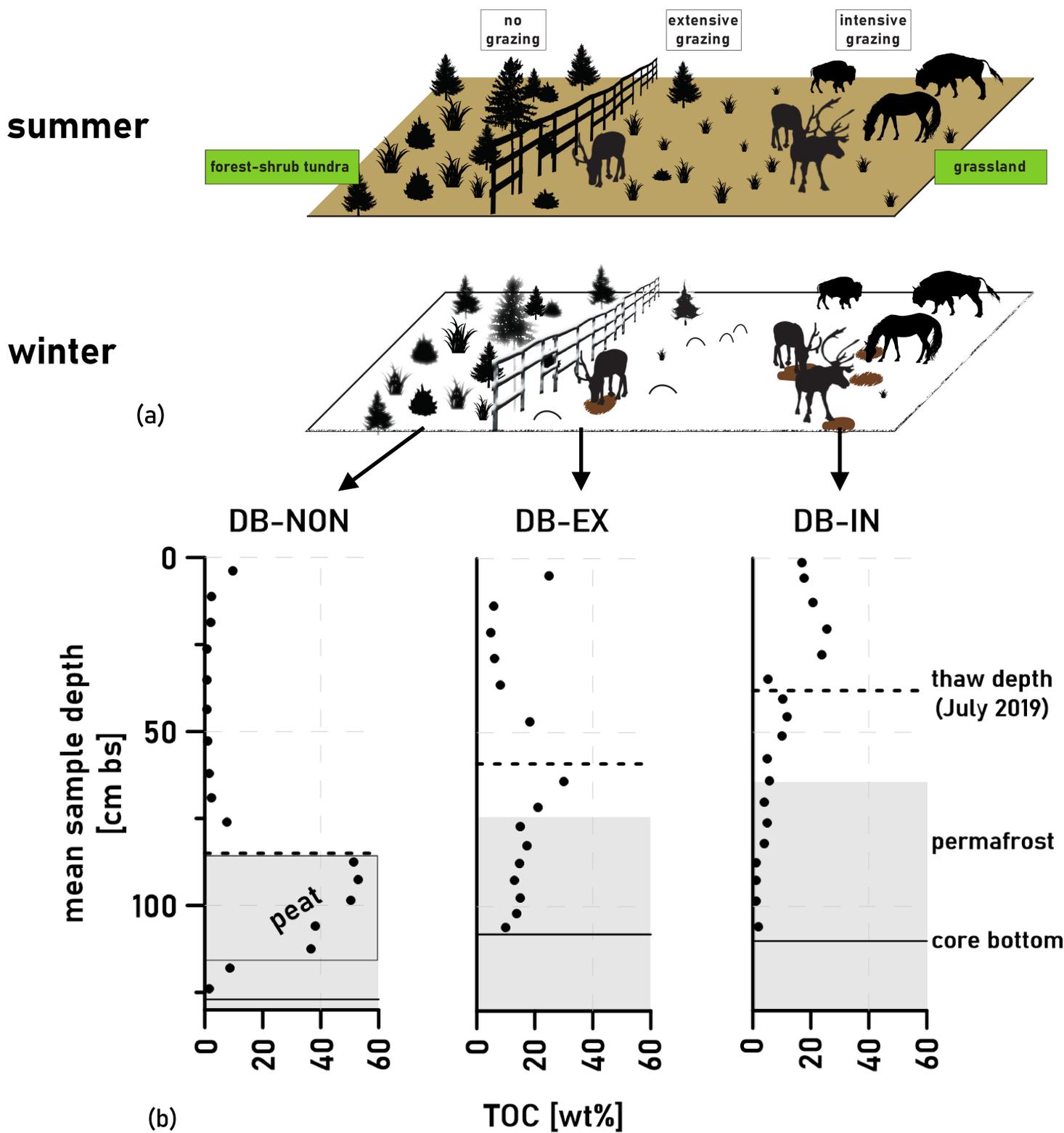
Impacts of Large Herbivores on Permafrost Soil Carbon Storage

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Intensive grazing by large herbivorous animals increased soil carbon storage in the active layer of a Siberian permafrost landscape significantly over a period of 22 years, while also reducing thaw depth.



Study area

- Kolyma lowlands, NE Siberia
- drained thermokarst basin
- Pleistocene Park

Methods

Field

- AL: fixed volume cylinders @ soil profiles
- PF: SIPRE auger



(a) soil profile at DB-EX; (b) permafrost core from DB-EX

Lab

- ice / water content
- grain size composition
- TOC
- TN
- $\delta^{13}\text{C}$
- ^{14}C dating
- $\delta^2\text{H}$ & $\delta^{18}\text{O}$ from pore water

(a) Schematic depiction of the grazing setting with bare ground/vegetation (summer) and snow cover (winter); (b) TOC values over depth for non-grazed, extensively grazed and intensively grazed sites within a drained thermokarst basin

Results

- 6x higher TOC in AL at intensively grazed sites
- lower degree of decomposition of OM at intensively grazed sites
- grassland vegetation, less shrubs under grazing impact



Most likely due to

- snow removal in winter
- vegetation disturbances & selective browsing

Next steps

circumarctic comparison studies

