Background

- Fire is an important disturbance in Arctic ecosystems that is increasing in frequency and severity as a result of climate warming.
- In Cajander larch (*Larix cajanderi*) forests of far Northeastern Siberia, increased fire severity and decreased soil organic layer (SOL) depth can alter the seedbed and have implications for larch seed germination, potentially impacting tree density.
- In Alaskan tundra, recent fires have altered the SOL and combusted vegetation, creating conditions that could better suit early successional species and rooted vegetation capable of surviving fire.



Shifts in vegetation in the Arctic as a consequence of fire could impact species composition, diversity, and C pools stored within these plants, which can have implications for C storage in the SOL and mineral soils, water cycling, and food/habitat availability for wildlife.

Objective

To better understand successional dynamics post-fire in the Arctic in the short-(years) and long-(decades) term by observing fire effects on vegetation composition, diversity, and C pools across sites located in two regions of the Arctic– the understory of larch forests of varying density (indicative of varying recruitment post-fire) within a 76-year old fire scar in Siberia near Cherskiy, Russia, and 2-year old and 45-year old fire scars in tundra in the Yukon-Kuskokwim Delta, Alaska.

Hypotheses

Siberia

- Understory species composition and diversity will be highest in mature larch stands with medium density due to moderate environmental conditions present in these stands.
- Understory aboveground C pools will decrease as larch density increases because tall shrubs, which need more light and deeper rooting volume, will be outcompeted by other plant functional types like mosses.

Alaskan Tundra

- Species composition/diversity will be lowest at the 2-year old burn compared to the 45-year old burn and unburned areas. Forbs and other rooted plants will dominate the recent burn, while lichens will dominate older and unburned areas as succession continues to progress.
- Vegetation aboveground C pools will gradually increase as vegetation has recovered over time, being highest in unburned areas due to the recovery of lichens.



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