



## Climate-induced change in Siberia: A focused view of Tuva and Sakha.

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Atmosphere Ocean General Circulations Models (AOGCM) are in agreement that Siberia is expected to experience warming in excess of 40% above global mean temperature increases by 2100. Moreover, it is predicted temperature increases will be evident in both the summer and winter. In association with changes in climate, the extent of the fire season, the amount of area burned and fire severity are predicted to increase. Fire regime increases are predicted to be the catalyst for ecosystem change, which will force ecosystems to move more rapidly towards equilibrium with the climate. Bioclimatic model results predict expansive changes in ecosystems, from a landscape dominated by taiga to a landscape dominated by steppe and forest-steppe.

We focus on two sparsely populated regions, where one would expect to find the initial signs of climate change: the Tuvan Republic located in south central Siberia; and the Sakhan Republic located in northeast Siberia. Tuva is located at a vulnerable southern border, south of the Sayan, and contains 9 Biospheric Reserves, each representing distinct ecosystems. Additionally, Tuva is the home of several relic *Pinus sylvestris* forests. Sakha is located at the northern range of the taiga, and the dominant species in this permafrost-lain ecosystem is hardy larch, primarily *Larix gmelini*.

Predicted increases in rainfall are not apparent, and often, precipitation change has been negative. The growing season length has already increased by about 6 to 12 days. In south central Siberia, January temperature increases have exceeded those predicted by the Hadley Centre scenario for 2090, and July temperatures are below predictions, as expected. Consequently, several of the relic pine forests have burned (some repeatedly), and natural regeneration is not visible at several sites, even one that had been re-planted on several occasions. In the last decades, these regions have experienced changes in climate and, potentially, initial signs of ecosystem change. In this report, we present a concentrated view of two regions that are expected to change and may be currently showing indications of climate-induced change.