

Assessment of interlinkages among industrialization, climate change, and forest fire activity: Thematic study of the Republic of Sakha (Yakutia), Russia

*Kiunnei Kirillina¹, Wanglin Yan¹

1. Graduate School of Media and Governance, Keio University SFC

Forest fires play a critical role in shaping the ecosystem and atmospheric patterns. In turn, fire regimes are highly influenced by climate and human activities. Natural cycles, human activities like land-use changes and fire exclusion, and human-caused climate change can also influence the likelihood of fires. This study aimed to identify the causes underlying the increase of fire activity in one of the most fire-hazardous regions of Russia, the Republic of Sakha (Yakutia). The forest in this republic is performing the important function of permafrost protection. Deforestation might cause a catastrophic permafrost degradation, as the decrease of forests there mainly occurs due to fires.

To understand the patterns of historical fire activity, we analyzed the past history of fire events in the Sakha Republic through a newly developed approach for historical fire regimes characterization. Then, to identify the exact cause of intensification of fire activity was constructed an analytical approach for the assessment of interlinkages among industrialization, climate change, and forest fire activity. The study found that the main contributor to the increased historical fire activity in the republic was climate warming documented there since the 1960s, especially in spring season, which affected the overall duration of the fire season. As one main cause of recent expansion of fires, this research identified as significant the socioeconomic and land use changes undergone on the territory of the republic since the 2000s, which have resulted in extensive use of forest and forested land, and increased number of anthropogenic fires and related atmospheric changes.

Keywords: forest fires and climate change, land use changes, anthropogenic fires, GHG emissions