GC31B-0456 Effects of Repeated Fires in the Forest Ecosystems of the Zabaikalye Region, Southern Siberia

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Fire is the main ecological disturbance controlling forest development in the boreal forests of Siberia and contributing substantially to the global carbon cycle. The warmer and dryer climate observed recently in the boreal forests is considered to be responsible for extreme fire weather, resulting in higher fire frequency, larger areas burned, and an increase of fire severity. Because of the increase of fire activity, boreal forests in some regions may not be able to reach maturity before they re-burn, which means less carbon will be stored in the ecosystem and more will remain in the atmosphere. Moreover, if one fire occurs within a few years of another, some stands will not re-grow at all, and even more carbon will accumulate in the atmosphere. Zabaikalye region located in the south of Siberia is characterized by the highest fire activity in Russia. With a use of the satellite-based fire product we found that there are about 7.0 million hectares in the region burned repeatedly during the last decade. We have investigated a number of sites in-situ in light-coniferous (Scots pine and larch) forests and evaluated the impacts of repeated fires on fuel loads, carbon emissions, and tree regeneration. Substantial decrease of carbon stocks, change of the vegetation structure and composition, and soil erosion were observed in many areas disturbed by repeated fires. At drier sites located in the southern regions repeated fires prohibited successful regeneration and resulted in forest conversion to grassland. Detection and monitoring of changes in the areas of Siberia where repeated fires have caused a major shift in ecosystem structure and function is required for the development of sustainable forest management strategies to mitigate climate change. The research was supported by NASA LCLUC Program.

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