Increasing fuel loads and fire risks after clear-cut logging in the Angara region, central Siberia

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The Angara region located in the southern taiga of Central Siberia is one of the most logging-disturbed regions in Siberia. We have evaluated logging and fire disturbances using MODIS and Landsat data for the period 2002–2020 and carried out extensive fieldworks to estimate in-situ fuel loads in the different ecosystem types. Then we have developed fuel loads maps by integrating satellite and ground-based data with respect to the forest-growing conditions and the disturbance of the territory by anthropogenic and natural factors (fires, loggings, insects).We found that annual disturbed area increased during the last two decades leading to rapid forest degradation in the region. Clear-cut areas are characterized by high surface and ground fuel loads which reach 140 t/ha and more, mainly due to logging debris. Fuel loads substantially increased over the Angara region from 2002 to 2020 resulting in an increase of fire risks and severity as well as of amount of fuels consumed and carbon emitted to the atmosphere. Improved and strictly-enforced conservation and management policies are required to halt continued forest degradation in the Angara region and similarly-affected boreal forests in Siberia. The research was supported by the RFBR, Government of the Krasnoyarsk krai, and the Krasnoyarsk regional foundation of scientific and scientific-technical support (Grant #20-44-242004).

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