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# Impact of uncertainties in vegetation type on biomass burning emission estimates in Siberia

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Wildfires in Russia have the potential to influence regional and global climate systems through both direct and indirect effects due to the large carbon stocks accumulated in forests and peat bogs. Biomass burning emissions vary depending on vegetation type and fuel loading, current and past weather conditions, and topography, all of which affect fire behavior. Estimates of carbon emissions from fires in Russian boreal forests vary greatly depending on the methods and datasets used. The uncertainties in ecosystem types burned in Siberia were estimated on the basis of different vegetation maps (GLC-2000, Globcover-2009, MODIS Land Cover Collections 4 and 5, and the Digitized Ecosystem map of the Former Soviet Union). While there is an agreement in the overall trend in area burned by different land cover categories, there is substantial disagreement in ecosystems burned for the same year between these vegetation maps. Also, this variation differs from year to year, which results from the spatial heterogeneity of the land cover products. The difference in the estimated proportion of area burned by ecosystem type can vary 1.5-fold and more from lowest to highest values. This results in 60% and more difference in carbon emission estimates for Siberia. Verification and validation of land cover datasets along with the development of fuel maps and combustion models are essential for accurate Siberian wildfire emission estimates, which are needed in order to better understand the relationship between wildland fire emissions and changing climate, and to develop strategies to mitigate negative smoke impacts on the environment and human health.

Keywords: wildfires, land cover maps, carbon emissions, uncertainties, Siberia