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SPATIAL AND TEMPORAL VARIABILITY OF BURNED AREAS IN NORTHERN EURASIA FROM 2002 TO 2012

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ABSTRACT: (for Special Session – Wildfires)

Northern Eurasia covers 20% of the global land mass and contains 70% of the boreal forest. The region has experienced the greatest temperature increase and this trend is projected to continue through 2100. Warmer temperatures will result in higher fire activity which will greatly change the area burned, landscape, ecosystems, and carbon cycle. Biomass burning in Northern Eurasia is also a significant source of atmospheric black carbon that can be deposited on Arctic ice and accelerates ice melting during certain times of the year. Thus, we have developed daily fire burned areas at a high spatial resolution (500m) in Northern Eurasia from 2002 to 2012 in order to evaluate the trends of different fire sources. The burned areas are derived from the MODIS thermal anomalies product (MOD14), MODIS spectral bands of 1–7, and land cover product (MOD12). The algorithms for mapping burned areas have been validated against burn scars derived for Landsat images. Our study found that the area burned annually varied considerably, ranging from 1.6×10^5 km^2 in 2011 to 4.9×10^5 km^2 in 2003 with an average of 2.6×10^5 km^2. Grassland dominates the total burned area (61%) followed by forest (27%). For grassland fires, about three-quarters of the burned area occurred in Central and Western Asia and about 17% in Russia. More than 90% of the forest burned area was in Russia. Our results are consistent with the NASA official burned area product (MCD45), but are about twice the GFED burned area product. We will present the trends and temporal variability (monthly, annual, inter-annual) of burned areas in each land cover type for each geographic area. The effects of environmental conditions (e.g., temperature, humidity) on the spatial and temporal variability of burned areas also will be presented.