Geophysical Research Abstracts
Vol. 17, EGU2015-9958, 2015
EGU General Assembly 2015
© Author(s) 2015. CC Attribution 3.0 License.

Boreal wildfire emissions from Alaska, USA and Zabaikalsky krai, Russia 2002-2012

Kirsten Barrett
Geography Department, University of Leicester, United Kingdom (kirsten.barrett@le.ac.uk)

Boreal forests are the largest terrestrial biome, and account for 27% of global forest cover and a major sink of atmospheric carbon. Increasing wildfire activity in some boreal regions threatens accumulated carbon stocks through combustion, decomposition, and reduced potential for future uptake. There is substantial spatial variability in boreal wildfire characteristics, particularly at the continental scale, which results from differences in climate and vegetation composition between boreal forests in Eurasia and North America. Quantifying boreal wildfire characteristics such as frequency and intensity at a global scale is possible using active fire detection datasets such as those available from AVHRR and MODIS. This study uses the MODIS MCD14ML to compare wildfire emissions (calculated from Fire Radiative Energy) from Interior Alaska, USA and Zabaikalsky krai, Russia between 2002 and 2012. Both regions have experienced increasing fire frequency and severity over the last several decades, likely in response to changing temperature and precipitation regimes. The two regions are similar in size and cumulative emissions, but boreal wildfires in Alaska are generally more intense and produce more emissions per unit area. Wildfire emissions in the Alaskan Interior are also higher due to a longer "residence time" of fires, which may smoulder in the duff layer for several weeks after a front has passed. This "residual burning" accounted for an average of 64% of active fire detections in Interior Alaska, and 47% of those from Zabaikalye, although interannual variability was substantial. The fraction of residual burning was higher in both regions during larger fire years, when presumably more biomass is available to sustain combustion. The relationship between burned area and fraction of residual burning was stronger in Alaska, possibly due to a greater tendency for ground fires to smoulder in thick duff layers found in black spruce-sphagnum dominated areas. Although emissions were higher per unit of area burned in Alaska, greater fractional area burned in Zabaikalye caused higher total emissions from biomass burning during the study period.