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Impact of the Arctic Oscillation on Forest Fires in Siberia

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Russia's forests play an important role in the global carbon cycle, affecting atmospheric carbon both as a sink (through tree growth) and as a source (through respiration, decay and forest fires). Because of their enormous scale and large interannual variability, these fires can tip the net carbon balance of a forest between uptake and release. The recent scientific discussion of possible causes of the observed increased carbon concentration anomalies in 2002 and 2003 in the atmospheric record has raised the hypothesis that fires in the Northern Hemisphere could be the main factor. In order to identify the relationship between Siberian forest fires and climate variability, we compare new measurements of burned forest area in Central Siberia derived from remote sensing with time-series of several large-scale climatic indices for the period 1992 - 2003. We find that interannual variability in Central Siberian forest fires is closely related to a combination of the Arctic Oscillation index and regional summer temperature. This may be because combustible biomass and its flammability are influenced by large-scale climate patterns and regional summer temperature. In contrast, we find no significant correlation between Siberian forest fires and indices for the El Niño / Southern Oscillation.