Geophysical Research Abstracts, Vol. 8, 00746, 2006
SRef-ID: 1607-7962/gra/EGU06-A-00746

Seasonal savanna fire emissions in southern Africa

S. Korontzi

Department of Geography, University of Maryland (stef@hermes.geog.umd.edu), USA

A modeling framework has been developed to examine the spatial and temporal aspects of biomass burning emissions from southern African savanna fires. The complexity of the fire emissions processes is described using a spatially and temporally explicit model that integrates SAFARI-2000 satellite-driven fuel load amounts, the GBA-2000 satellite burned area time series and empirically derived seasonal parameterizations of combustion completeness and emission factors (EFs). To represent fire behavior characteristics, land cover is classified into grasslands and woodlands using the MODIS percent tree cover product. The combustion completeness is modeled as a function of grass fuel moisture and the EFs as a function of grass fuel moisture in grasslands and fuel mixture in woodlands. Fuel moisture is derived from satellite vegetation index time series. The analysis at the regional scale shows that early burning in grasslands may lead to higher amounts of products of incomplete combustion, despite the lower amounts of fuel consumed, compared with late dry season burning. In contrast, early burning in woodlands results in lower emissions, in both products of complete and incomplete combustion, because less fuel is consumed than in the late dry season when the fuels are drier. Overall, burning in woodlands dominates the regional emission budgets. Emissions estimates for various atmospheric species, many of which are modeled for the first time, are reported. Especially high is the previously undetermined at the regional scale contribution of oxygenated volatile organic compounds. A sensitivity analysis of fixed vs. seasonally variable EFs and combustion completeness demonstrates the importance of accounting for the seasonal variations of these two variables in emissions modeling.