Geophysical Research Abstracts
Vol. 12, EGU2010-14810, 2010
EGU General Assembly 2010

Spatial and temporal variability in the ratio of trace gases emitted from biomass burning: review of available literature data

Thijs van Leeuwen and Guido van der Werf
VU University Amsterdam - Faculty of Earth and Life sciences - Department of Hydrology & Geo-environmental sciences

Fire emissions play an important role in atmospheric chemistry, but a thorough quantification of the emitted trace gases, and especially the partitioning of combusted biomass into different combustion products, hinders progress in many different research fields. To date, most studies have used biome-averaged ratios (emission factors, EFs) to estimate trace gas emissions, even though it EFs are know to vary substantially in time and space. Here we used literature-derived emission factors in combination with satellite data on vegetation characteristics and moisture conditions to better understand the spatio-temporal variability in emission factors for several trace gases, including CO and CH4. Weighted means of CO and CH4 emissions factors were derived to better represent specific areas in the defined vegetation zones. Furthermore the relations between different satellite datasets though to drive the variability in EFs (vegetation continuous fields, precipitation, soil moisture) and EFs were explored. Although reasonable correlations were found for specific case studies, correlations based on the full suite of available measurements were poor, possibly due to differences in measurement techniques, flaming-smoldering assumptions, and incomplete information on the location and time of measurement. We argue that future measurement campaigns could benefit global modeling more when measurements are made over the full fire season, or alternatively if ambient conditions are measured in parallel to the EF measurements. A future step will be to implement our findings into the Global Fire Emission Database (GFED), and in combination with inverse modeling and space-based observations of trace gases, to investigate how a better representation of the spatial and temporal variability in EFs may improve our representation of biomass burning emissions.