Geophysical Research Abstracts,
Vol. 11, EGU2009-5547, 2009
EGU General Assembly 2009

Eddy Covariance trial measurement of carbon dioxide and fine particle emission during a controlled Savannah fire

G. Fratini (1), A. Forgione (1), P. Ciccioli (2), D. Papale (1), and R. Valentini (1)

(1) University of Tuscia, Department of Forest Sciences and Resources (DiSAFRi), Viterbo, Italy (gfratini@unitus.it), (2) Istituto di Metodologie Chimiche, Area della Ricerca del C.N.R. di Roma, 00016, Monterotondo Scalo, Italy

During the CarboAfrica Fire Experiment (CA-FE) held in August 2007 at the Kruger National Park (South Africa), the concurrent determination of carbon dioxide, water vapor and size segregated particle (0.32 – 6.24 μm nominal optical diameter) fluxes was performed by Eddy Covariance. The instrumentation (EOLO) recently developed by Fratini et al. (2007) for the determination of particle fluxes from desert storm events in Northern China, was used for a real-time determination of carbon particle fluxes. Although data were collected in three different plots, only in one of them the data set was long enough to follow the evolution of chemical species during the different phases in which fire develops. Results from other plots were used to corroborate the analysis. Emission fluxes of CO_2 as high as $4.*10^3$ μmol/m^{2}s were reached during the flaming phase, whereas values ranging between 20 and 60 μmol/m^{2}s were recorded during the smoldering phase. The temporal evolution of particle fluxes only partly correlated with those of CO_2 with values ranging from ca. $3\text{-}4*10^3$ particles/m^{2}s in the flaming phase down to few tens of particles/m^{2}s during the smoldering phase. While fluxes of carbon particles in the size range investigated dropped down quickly after the flaming phase, probably due to gravitational settling, CO_2 fluxes reached an almost steady state, likely to last for several hours after the end of the flaming phase.

References

Fratini G., Ciccioli P., Febo A., Forgione A., Valentini R. (2007) Size-segregated fluxes of mineral dust from a desert area of northern China by Eddy Covariance. Atmos. Chem. Phys., 7, 2839-2854