Atmos. Chem. Phys. Discuss., 7, S5612–S5613, 2007
www.atmos-chem-phys-discuss.net/7/S5612/2007/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Modelling the optical properties of fresh biomass burning aerosol produced in a smoke chamber: results from the EFEU campaign" *by* K. Hungershöfer et al.

Anonymous Referee #2

Received and published: 3 October 2007

The authors present and discuss the optical properties of aerosol particles that resulted from burning samples of African Savanna grass and hardwood in their laboratory. The authors made measurements of the size distribution, the scattering coefficients and the absorption coefficient and other quantities. The results indicate that the particles were larger and less absorbing than the results of other investigators. The authors spend a great deal of effort to explain their results. However, their procedures look to be solid and I could detect no major weakness in their analysis. Therefore, I have no objection to the paper being published. I do have several comments.

First, the paper is rather long for relatively straightforward results. The authors seem

to feel the need to overturn every stone to explain why their results are less absorbing than other results, but I don't feel they need to go into quite as much detail.

Second, the authors spent a fair amount of effort trying to establish the effective refractive indices of the aerosol mixture. They found that the both had about the same value (the grass was 1.60-0.010i and the hardwood was 1.56-0.010i at 550 nm). However, the usefulness of the effective refractive indices is limited and they might have well just used the scattering and absorption per mass instead. The fact that their "model" calculations could not match the results at the beginning and ending of the combustion run is exactly why effective refractive indices are of limited value.

Third, as the authors noted because they only measured the absorption at one wavelength, they were unable to determine if the absorption observed was due to a very small amount of highly absorbing carbon particles (BC or LAC) or a larger amount of weakly absorbing organic particles. This limits the understanding of the results.

Finally, like the authors I don't understand why the CO/CO2 ratio indicates that the combustion is flaming but the absorption results are more in agreement with smoldering combustion. I'm not an expert in combustion chemistry, but is it possible that these terms are too broad so that they are not determinative of the resulting aerosol products?

Technical corrections

pg 4 line 110 deposited not deposit

pg 12 line 387 Schkolnik et al (2007) is missing

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 12657, 2007.

ACPD

7, S5612–S5613, 2007