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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Measured and modeled humidification factors of fresh smoke particles from biomass burning: role of inorganic constituents" *by* J. L. Hand et al.

Anonymous Referee #2

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The manuscript describes measurements of humidification factors measured during the FLAME study. Aerosols produced by controlled burns of different biomass fuels were tested. The humidification factors were measured with humidity controlled nephelometry. These measurements were supplemented by measurements of particle size distributions, bulk PM2.5 chemical composition and SEM analysis. The chemical composition was used to predict aerosol water content at different RH using E-AIM model, which in turn allowed estimation of humidification factors. A comparison of the predicted and measured humidification factors showed that hygroscopic properties of the tested biomass smoke aerosols can be predicted using only the inorganic fraction. The manuscript is well written, the methods are well described and the data interpretation

is solid. I have only a few minor comments and suggestions:

While I do not think this would affect the results significantly, I wonder how the substitution of K with Na would affect model predictions at low RH in the metastable case. Since the solutions at low RH are strongly non-ideal, ions of different sizes such as Na and K would probably have different activities.

I am not convinced that the data shown in Fig.6 provides an evidence of a deliquescence point. The jump in the measured f(RH) is quite small in comparison to the experimental uncertainty.

I would suggest changing the scale of the y-axis of Figures 2-4. I understand that the authors wanted to demonstrate relative hygroscopicity of different biomass burning aerosols by using the same scale on all figures. This, however, makes it very difficult to compare the observations with the model.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 4225, 2010.