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Interactive comment on "Size distribution and hygroscopic properties of aerosol particles from dry-season biomass burning in Amazonia" *by* J. Rissler et al.

Anonymous Referee #1

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This is a very detailed and comprehensive analysis of size distribution and hygroscopic properties of aerosol particles in a period encompassing dry and wet seasons in Amazonia. The paper is a good contribution to the above topic and is suitable for publication in ACP. Below are some suggestions for the consideration of the authors:

1) The authors raised the possibility of cloud processing in explaining the evolution of RL data (on page 8179). It may be useful to discuss the diameter of the droplet mode particles in relation to the experimentally observed modes. The droplet mode usually peaks at about 0.5 to 0.7 micron on a mass (or volume) basis (see references

below). 2) In the literature, the water uptake data of levoglucosan, mannosan and galactosan, the three major WSOC found in aerosols derived from biomass burning , are available (Mochida and Kawamura, 2004; Chan et al., 2005). All these species have a very similar growth curve (DF as a function of RH) and they are less hygroscopic than simple dicarboxylic and multifunctional acids (Prenni et al., 2001; Peng et al., 2001). Gao et al. (2003) postulated that levoglucosan can be converted to simpler organic acids via ageing. Laboratory hygroscopic measurements of levoglucosan and the simple acids seem to be consistent with this assertion. It would be interesting to know if the hygroscopic data (and composition data, if available) of RL upon ageing show a similar trend that can be explained semi-quantitatively by the hygroscopic data of these chemical species. Recent measurements of fulvic acid and humic acid in the literature may also be useful for comparison with the hygroscopic data since the authors suggest the importance of macromolecular organic species or HULIS in the aerosol (Chan et al., 2003; Gysel et al., 2003; Brooks et al., 2004).

Minor comments

1) The authors cautioned the readers the definition of AS in a number of places in the manuscript. Both AS and  seem to be more useful in describing the CCN property than the hygroscopic growth although I do agree that listing them out would make the analysis of the hygroscopic data more comprehensive. 2) There is a typo on page 8150, “without NOT knowing the real molecular weightĚ”

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References on the droplet mode:

Kerminen, V.-M., Ojanen, C., Pakkanen, T., Hillamo, R., Aurela, M., and Merilaien, J.: Low-molecular-weight dicarboxylic acids in an urban and rural atmosphere, J. Aerosol Sci., 31, 349-362, 2000. Kerminen, V.-M., and Wexler, A.S.: Growth laws for atmospheric aerosol particle: an examination of the bimodality of the accumulation mode, Atmos. Environ., 29, 3263-3275, 1995. Meng, Z., and Seinfeld, J. H.: On the source of the submicrometer droplet mode of urban and regional aerosols, Aerosol Sci. Technol., 5, 101-109, 1994. Yao, X. H., Fang M., and Chan, C. K. Size distributions and formation of dicarboxylic acids in atmospheric particles, Atmos. Environ., 36, 2099-2107, 2002.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 8149, 2005.