Atmos. Chem. Phys. Discuss., 5, S4440–S4442, 2005
www.atmos-chem-phys.org/acpd/5/S4440/
European Geosciences Union

Atmospheric Chemistry and Physics Discussions

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

J. Rissler et al.

Received and published: 13 December 2005

First we want to thank the reviewer for carefully reading the article, for the nice response to the article, and the ideas and suggestions for improving the article. Below the answers to the specific comments are given.

Section 3.1: As the referee points out it is possible that semi-volatile compounds may evaporate at 50 degrees C, which means that the true density could be slightly higher than that calculated from the TEOM and the DMPS measurements. However, the measurements were conducted in an area with a diurnal average temperature of ~27 degrees C during the relevant period (day average 32 degrees). We cannot rule out

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the possibility that evaporation takes place in the TEOM, but the effect is most likely not very strong. We add a comment about this in the article.

We agree with the referee that the section should be renamed to “particle densities”.

Section 3.2.2: page 8165:

During the night observation of the average PM0.85 showed stable concentrations (calculated from DMPS measurements). This indicates that the decrease in the number concentration can be explained by coagulation, as suggested by the referee. The evolution of the aerosol in the NL is also the result of dry deposition and condensation of gases, taking place in parallel. Furthermore a few new sources, even if not strong, can be present. The effects on concentrations and the particle distributions are small and we cannot conclude that coagulation is the dominating process. Some more information was added in the text.

Page 8166 line 19: In the Amazon region the weather is very stable - every day showing very similar pattern. The events were taking place during a short time period when the particle concentrations were extremely high (not only during these days but adjacent days and nights). No similar events were observed during the transition period or dry period. We suggest that this could be a sign of depressed convection - for us the most plausible explanation. This is also discussed in Fuzzi et al.

Page 8168: Both the RH and the temperature follow a diurnal pattern. During the nights the temperature decreases and the RH increases to nearly 100%. This could explain why there is nucleation during the nights, but not why it decreases after 24:00 LT to increase again after 04:00 LT. We have been discussing the issue with experts on nucleation, and do have some speculations, but still no unequivocal explanation. It is likely that high RH and low temperature somehow trigger the events. One possibility is that the particles are formed in the transition between the nocturnal stable layer and the residual layer when the air masses are mixed.

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Since the article does not focus in these events, we did not include any speculations about the events. We are planning on doing a more solid analysis and later write a separate paper on the nucleation events. To be consequent we remove the only speculation made.

Page 8172 line 14-16: The section is deleted.

Page 8172 line 20: We agree that the paragraphs can be made clearer and we therefore shortened and rewrote parts of the section. The extrapolation to supersaturation is investigated in Vestin et al.

Page 8176: We changed the sentence according to the suggestion.

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