

## ***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 #3**

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Referee comments

The paper presents an interesting and relevant dataset, mainly on hygroscopic properties of aerosols in Amazonia in and outside air masses affected by biomass burning.

The paper definitely contributes to the literature in the field and contains original material. In particular, it enhances the dataset on hygroscopic properties of atmospheric aerosols and it does so in such a way that the results are easily transferable to large scale models, due to the provided parameterizations. A few minor comments should be considered:

Section 3.1: The TEOM was operating at 50 degrees C. The authors should include a brief discussion on possible artifacts on the measured mass (evaporation of semi-volatile compounds) and the associated estimation of particle densities. Further, strictly speaking, mass closure is not performed; closure can only be made when the mass is obtained by two independent methods (TEOM vs. size distribution together with independently measured density. Here, the density is fitted in order to obtain agreement between the two methods. Suggest to rename section 3.1 to ‘aerosol densities’, and not to use the term ‘mass closure’.

Section 3.2.2. page 8165 line 24: could coagulation be responsible for the trend in particle number and diameter during the night?

Page 8166 line 19: it is difficult to prove here what is cause and consequence of the high concentrations on the 3 days; if convection is suppressed for some other reason, particle concentration would be high as a consequence.

Page 8168, regarding the unexplained nucleation events: are there trends in temperature and humidity available that could help explain the phenomenon? Mixing of air masses with different humidities often induces nucleation (see Nilsson and Kulmala, JGR, 1998, Vol. 103 , No. D1 , p. 1381).

Page 8172 line 14 – 16 (“The extrapolation. . .”): it seems to me this is repeating the earlier phrase started on the last line of the previous page (“the single parameter . . . RH scan groups”).

Page 8172 line 20: applicable to other RH: does this mean outside the 30-90% range? This section on extrapolation and calculation of a slightly different k is not very clear.

Page 8176 line 29: replace “RL/NL. . .” by “. . .NL and RL was the dominating nearly hydrophobic group in the former, indicating. . .”

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