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Interactive comment on "Importance of the organic aerosol fraction for modeling aerosol hygroscopic growth and activation: a case study in the Amazon Basin" *by* M. Mircea et al.

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This paper discusses how the aerosol composition, in particular water soluble organic compounds (WSOC), affects the hygroscopic growth and cloud condensation activity of aerosol particles in Rondonia, Brazil, over a period encompassing the dry season to the onset of the wet season. With the size segregated aerosol composition (both inorganic and organic constituents), the measured hygroscopic growth and cloud activation of aerosol particles are compared with model predictions utilizing modified Kohler theory with various properties (e.g., solubility, surface tension, and dissociation). The work clearly demonstrates the importance of the knowledge of aerosol composition, especially WSOC, on predicting the aerosol properties such as hygroscopic growth

and cloud condensation nuclei activity. Below are some comments for the authors to consider:

1. In the paper, the assumption of internal mixture of the inorganic and organic species in the modeling is implicitly imposed. It would be useful to readers if the authors can clarify and elaborate this assumption. This is especially important when the authors do not show the mode characteristics of the H-TDMA measurements in this paper.

2. Page 5262, the authors describe how to use equation 1 to determine the wet diameter of the aerosol particles at 90%RH and the supersaturation needed for an aerosol particles to activate. How is the diameter of the insoluble aerosol residue, DN, determined?

3. Page 5265, paragraph 3, the authors use equation 2 to determine the surface tension at different carbon concentration and assume that for the carbon concentration higher than 0.1 mol per liter, the surface tension is considered constant and equal to 52mN/m. Some rationales of the choice of 0.1 mol per liter as the concentration limit are needed. The symbols are not labeled in Figure 2.

4. Page 5268, paragraph 1, in the DGF prediction, what are the dissociation constants used for the organic compounds (not shown in Table 2)? In Figure 4, why do the model predictions (insol bullets) have dry aerosol particle diameters different from those of the measured DGF?

5. Page 5271, from Table 3, the average of the ratio of the predicted to measured DGF for different samples shows that, compared to other simulations, the insol simulation gives the best estimation of DGF for all samples (ratio ˜ 1). Any reason for this observation? This does not seem to be consistent with the discussions in the text.

6. Page 5275, paragraph 2, figure 6 shows the effects of the two organic model compound scenarios - “more” and “less” soluble - on DGFs and CCN number concentrations for TD aerosol sample. Did the authors also compare the simulation in other

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period (e.g., wet and dry periods)? Why were the TD samples chosen for this comparison?

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