

Interactive comment on “Aerosol number fluxes over the Amazon rain forest during the wet season” by L. Ahlm et al.

Anonymous Referee #1

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This paper represents a useful, important contribution to our understanding of particles over the Amazon. It is well written, and the methods used are technically sound. In particular, the authors describe the corrections applied to their eddy covariance fluxes clearly. I expect the Webb correction to be minor for particle fluxes, so agree with the authors' decision not to apply it to their data. The data are interesting, as is their interpretation. I recommend this manuscript for publication subject to minor corrections.

Most importantly, the argument that anthropogenic particles are not responsible for deposition, and that secondary organic aerosol is likely responsible, relies on Figure 14, which doesn't have any error bars attached. This makes the figure potentially misleading, and throws the authors' argument into doubt. A more robust way to present the data would be a box and whisker plot showing the mean, median and percentiles.

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Inclusion of uncertainties is essential to the figure and this key argument.

I am wary of nighttime fluxes of CO₂ over the Amazon. In particular, drainage is known to occur at this site due to the topography, and there is a large body of literature describing these effects and their potential corrections (see papers by Baldocchi et al., Goulden et al.). The authors should further comment on the potential for drainage to occur in particle fluxes before interpreting nighttime measurements.

p.17352/3, the authors comment on the relative size of the errors for particle fluxes versus CO₂ fluxes. The fact that these errors are larger for particles does not necessarily mean that the 'processes are more complex', and I suggest removing that statement. As alluded to further in the paragraph, the particle flux methods are associated with larger uncertainties.

Error bars should be included in most of the figures: Figure 7 shows particle concentration as a function of Black carbon concentration. Both these numbers should have uncertainties associated with them, and a bar chart seems inappropriate, without at least an indication of the uncertainties, and number of points that go into each bin.

Technical corrections. p. 17533, line 8 should read "Care" p. 17360, l23, should read "...data that do not fulfill"

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