

Interactive comment on “Multi-year statistical and modelling analysis of submicrometer aerosol number size distributions at a rain forest site in Amazonia” by Luciana Varanda Rizzo et al.

Anonymous Referee #2

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This paper presents measurements and interpretation of the diurnal and seasonal cycle of aerosol at Cuieiras, Central Amazon. The paper is quite well written, and the discussions are relevant and point to new questions linking the atmospheric dynamics and the vertical profile of submicrometer size aerosol. I would point to one aspect that is the conclusion that free troposphere air has to be transported to the BL to explain the Aitken mode variability. In page 3, line 18, the authors mention that new particle formation NPF has been reported in the outflow level of deep convection. This is seen in high altitudes over 10 km. Convective downdrafts have their origin in the lower troposphere, below say 4 km. It is not clear how the particles would find their way from upper troposphere to lower troposphere to be available to be transported to the BL.

Perhaps the authors can comment on that. Page 3, last line – why do you say that SE of Cuieiras is the downwind direction, wouldn't it be the upwind direction? The data on $\Delta\delta^{18}O$ and RH that goes into the cluster analysis have what temporal frequency? Downdrafts are associated to sudden changes on the value of $\delta^{18}O$ so that the main drop is at the beginning of a downdraft event and no further decrease is observed in spite of the fact that ozone or aerosol may continue to be transported. It is not clear how this is taken into account when defining the variables that go into the cluster analysis. They should be simultaneous, right? Please clarify this point.

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