Atmospheric
Chemistry
and Physics
Discussions

Interactive comment on "Biomass-burning and urban emission impacts in the Andes Cordillera region based on in-situ measurements from the Chacaltaya observatory, Bolivia (5240 m a.s.l.)" *by* Chauvigné Aurélien et al.

Anonymous Referee #2

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This work reviews the optical properties of aerosol sampled in a mainly free tropospheric site in Bolivia for a period that spans 4 years. The authors have performed a very comprehensive and thorough analysis of their results categorizing the optical properties of aerosol in the area based on the layer sampled (FT or PBL), based on source region and on seasons. The manuscript provides a rather complete picture of the aerosol optical properties of Chacaltaya with the only information missing is the composition of the measured particles. Even though, it is understood that such information (on composition) cannot be included in this work, a short summary would be

more than welcome. I recommend that this work is published with only some minor additions which I list below

Please add a table and summarize in a small paragraph what type of particles (dust, urban, ..etc) are expected to be sampled in each season, layer and source region based on the types of categorization performed in this work. This information is available, but scattered throughout the manuscript and if you compile into one small paragraph the reader will be greatly assisted in understanding your work.

The source region analysis performed in this work is puzzling. I am not sure how source regions have been distinguished. As an example C6 and C4 seem to overlap on Fig 4b. The same holds for source regions C1 and C2. There is a second graph in the lower left corner of Fig 4b for which I could not find any explanation. What is this graph about and how it is different than the main one of Fig4b? Please improve the caption of Fig 4 to include all information so that the reader can decipher the plots easily. Some of the info required to do so are found in the text but definitely the info provided is not enough. Since you have performed this analysis for 4 years, the individual trajectories for each source region should be shown in a separate (for each source region) graph in the Appendix. Please also add another plot showing the average trajectories for each source region on a map. Hysplit has this ability to produce average trajectories and so other software that are free to use. Personally I would recommend that the average trajectories graph for each cluster to be included in Fig 4. However it is not mandatory.

There is a problem with the term ε in Eq 11. Is sa and ca are the sine and cosine of the same angle then by definition ε=0 regardless. This is due to the well known formula of $\cos2\theta + \sin2\theta = 1$. I suspect a typo. In addition if $\sigma\theta$ corresponds to the 15 minute average wind direction as stated in Line 179 what is the $\theta(15)$, $\theta(30)$, $\theta(45)$, $\theta(60)$ of Eq. 10. I thought they denoted different time intervals. Please spend some effort to explain further how the classification shown in Fig.2 is performed. In other words explain further what is discussed in Lines 181 and 182.

Despite that most of this work relates to phenomenology, there are two important findings. These are the very low AAE reported during the wet season and the linear relationship between SSAAE and AAE observed during the wet and dry seasons. I am wondering if such low AAE have been reported elsewhere in literature. Please discuss. Can the authors provide an explanation on the linear relationship observed in Fig9a?

There is a typo in the caption of Appendix Fig A1. Aerosol should probably be absorption and for the entire dataset instead of the all dataset

C3