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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Similarities and differences of aerosol optical properties between southern and northern slopes of the Himalayas" *by* C. Xu et al.

Anonymous Referee #3

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The manuscript "Different aerosol optical properties between southern and northern slopes of the Himalayas" authored by C. Xu et al. reported aerosol optical properties by AERONET sunphotometer observations at 3 stations in southern and northern slopes of the Himalayas. This work should be appreciated for local aerosol climatology over the very special topography was described, and these information are very useful for the understanding of the atmospheric chemistry and atmospheric radiative transfer process over the Tibetan Plateau (TP). The results over this region are not easy to find in the literature. For these reasons I consider the subject of this paper interesting. I am looking forward to seeing the manuscript be published in ACP after minor revision

is done. Please find below some general and more specific suggestions on how to improve the manuscript.

General: 1, The AODs over the TP are very low, especially for the northern part of Himalayas. An estimation of the uncertainty of Angstrom Exponent (AE) data should be added. This question I have proposed my concern in the "Initial Manuscript Evaluation". However, the authors did not provide enough information to convince readers. In the section "2.2 AERONET data", an emphases about the sensitivity and uncertainty of AE should be given in order to support the analysis and conclusion about the following monthly and diurnal changes. "However, the quantitative uncertainty in AE for AERONET data is lacking"(Line 25, P20966), but the authors should be able to give an estimation of the uncertainty of the AE according to the Angstrom fomula with the specific values of AOD and their uncertainty. This question must be clearly explained so not to confuse authors about the use of AE data. 2, In the part of the HYSPIT analysis (Line 23, P20972), the data used should be described. The use of the model should be acknowledged. 3, The authors emphasized that "The aerosol load in upper atmosphere is comparable to that in the lower Atmosphere" about the daytime variations over the site QOMS_CAS (P20980-P20981), could you give some observation result, for instance, lidar observed vertical distribution of aerosols over the TP region, to surport your analysis?

Specific suggestions:

1, The English should be improved. For example: Line 13, P20965: "In monsoon season, the leading surface wind direction is southwest, while in other seasons the dominant surface wind direction is northeast. Southwesterly winds prevail during the monsoon season, and in other period the westerly winds prevail", the two sentences are duplicated.

2, In the Figure 1 (P20994). The area of the lower left is not consistant with the rectangle in the upper left image. Please re-plot it.

3, In the title of Figure 2 (P20995), “and the black dots indicate the locations of the three station”, it is difficult to find the black dots. Please re-plot it.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 20961, 2013.