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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Carbonaceous aerosols on the south edge of the Tibetan Plateau: concentrations, seasonality and sources" *by* Z. Cong et al.

Anonymous Referee #1

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This paper reports the results of one-year of measurements of carbonaceous aerosols (OC and EC), water-soluble organic carbon (WSOC) and major ionic aerosols at QOMS station, located on the northern slope of the Himalayas. The authors show a clear seasonal variation pattern of these aerosols with the maximums occurring in the pre-monsoon season and the minimums in the summer monsoon season. They further demonstrate by correlation analysis that high OC and EC observed in QOMS were mainly originated from biomass burning. The study presents a valuable dataset for environmental research related to the Tibetan Plateau and is a welcome addition to the literature, especially for the SOAR-TP special issue. The paper is well written and

organized in general. I would suggest the paper to be published in ACP after some discussions have been improved or clarified. Below are my comments in detail.

1. Abstract (P25052, L15-20): The authors state that "This phenomenon indicates that both slopes of Himalayas share a common atmospheric environment regime." How is an area of the southern slope defined by altitude? Does this statement apply only to an altitude of the same order of magnitude as that of Langtang and NCO-P, or it can also apply to lower altitudes as well? The altitude values of Langtang and NCO-P should be provided here. The sentence "While OC, EC and other ionic species. . .. . ., such as Langtang and NCO-P" needs to be rephrased. My suggestion is to remove "While" and to rewrite the phrase as ". . .. . .in the monsoon season, similar to the trends of aerosol composition reported previously. . .. . .".

2. The second last paragraph of Sect. 3.1 (P25059, L4-10): In addition to the radiation forcing of organic carbon aerosols, the cause(s) of high OC/EC ratios observed on the Tibetan Plateau is suggested to be discussed.

3. The first paragraph of Sect. 3.2 (P25060, L1-7): In the summer monsoon season, the observed OC and EC concentrations are very low with high variability for EC, as can be seen in Fig. 4b. What is the detection limit for EC in micro gram per cubic meter? In addition, in spite of high temperature and humidity, photochemistry might not be so intensive due to reduced solar radiation associate with rains during the summer monsoon season. Moreover, WSOC was observed to be low in the summer monsoon season as shown in Fig. 3. Therefore, linking an high OC/EC ratio to substantial SOC formation in the monsoon seasons needs to be reconsidered.

4. What are the time intervals of the data presented in Fig. 3 and Fig. 6? How about the regression result if the data point with the largest EC value (which seems to be abnormal) is skipped in Fig. 4 for the post-monsoon season?

5. Sect. 3.5: This section discusses about the transport mechanism of aerosols. However, not so much information on aerosol variations with transport at QOMS is pro-

vided. Specifically, the authors performed backward trajectory analysis, but variations in aerosols concentrations with different clusters are not discussed; they propose that local mountain wind system may play an important role in the transport of pollutants, but neither observed pollution tracer nor meteorological data is provided to support their viewpoint. Moreover, as they mentioned, carbonaceous aerosols observed at QOMS might be originated from northern India and Nepal, instead of Langtang and NCO-P areas, and thus other processes, such as wet removal during the summer monsoon season, should be considered for discussion.

6. The authors are suggested to take into account and refer to a study recently published in ACP (Xu, C., Ma, Y. M., Panday, A., Cong, Z. Y., Yang, K., Zhu, Z. K., Wang, J. M., Amatya, P. M., and Zhao, L.: Similarities and differences of aerosol optical properties between southern and northern sides of the Himalayas, Atmos. Chem. Phys., 14, 3133-3149, 10.5194/acp-14-3133-2014, 2014).

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