

Interactive comment on “Background aerosol over the Himalayas and Tibetan Plateau: observed characteristics of aerosol mass loading” by Bin Liu et al.

Anonymous Referee #1

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General comments:

In this work, the authors reported the baseline levels of aerosol mass loadings in four stations over the Himalayas and Tibetan Plateau (HTP). Currently, several researches regarding the characterization of aerosol chemical compositions over HTP have been conducted. However, very few studies involved the aerosol mass levels over a large area on the HTP, despitess its important implications. From this point, this work is meaningful. However, some issues need to be considered before its acceptable for publication in ACP.

Specific comments: 1. Line 107 - Line 109. The authors claimed that the South Asia Monsoon system is responsible for the transport of pollution from South Asia

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to HTP. However, many previous researches demonstrated that such long-range transport events actually occurred in winter or pre-monsoon seasons, mainly driven by the westerlies. So is there any more explanation? 2. Line 111, actually, for the impact of air pollution on the monsoon system, there are different perspectives by scientists (Ramanathan et al, 2005 and Lau 2006). So here I suggest the authors to rewrite the sentence to reflect this disagreement. Anyway, it highlights the importance to carry out more field observation of aerosols in this region. 3. Line 157 - 159. Why did you think there was an altitude effect? I checked the altitudes of each station, it appears the altitude effect among the four stations is not evident. 4. Line 164 - 165. It is not easy to follow. 5. Line 226, the authors wrote that ion chromatography (IC) was used to analyze the aerosol composition. However, in the main text, I can not find such description of the major ions data. It seems only the elemental data from ICP-MS was used. 6. How did you calculate the crustal materials basing on the elemental data from ICP-MS? More details should be presented, at least in the supplementary materials. As far as I know, the ICP-MS methods especially the acid digestion in the pretreatment have some difficulty to determine Si contents. If the crustal material account for 26%-29% of the total aerosol mass, so what is the constituent of the remaining fraction? Organic carbon and black carbon? 7. Line 240-241, what's the possible mechanism or process responsible for this distribution pattern? More explanation is needed. 8. Line 258 and Line 339, QOM should be QOMS, and in figure 4, sation should be station. 9. Line 296, How did you say the regional dust emissions contributed to the chemical composition of fine aerosols in Ngari station? Currently no data supports this point. 10. Line 315-316, the description of the MODIS aerosol fine-mode fraction data should be presented in the Section 2.3. (i.e. Methods of data analysis). Now only the MODIS land cover product was described in Section 2.3 11. Line 323, is there any more evidence to support your interpretation about the spread of ABCs in this region. Usually ABCs happened in the winter and pre-monsoon seasons, with much less air pollution in the summer monsoon season. 12. AERONET should be acknowledged. 13. Page 37, the title of Figure 13 should be shortened as brief as possible. Some sentences

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regarding the satellite data analysis could be moved to the main text.

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