

Response to Reviewer Comments

Dear Reviewer and Editors:

We are sincerely grateful to the editor and reviewer for their valuable time for reviewing our manuscript. The comments are very helpful and valuable, and we have addressed the issues raised by the reviewer in the revised manuscript. Please find our point-by-point response (in blue text) to the comments (in black text) raised by the reviewer. We have revised the paper according to your comments (highlighted in blue text of the revised manuscript).

Sincerely yours,

Dr. Yuanjian Yang, representing all co-authors

#Response to Professor Hu

The sample selection method for aerosol-type-dominated pollution seems to be incorrect, which will produce overlapping samples. For example, the number of samples that meet both FA and CSA greater than the threshold is small but still exists. The AOD value of FA is generally greater than that of CSA. How can this mean that CSA is the main influence in the Polluted_Coarse type defined in the article? It is not ruled out that the AOD value of FA is also large at the same time.

Response: Thank you. We have noted that the classification of aerosol conditions was not clearly addressed in the previous version. We agree that the AOD value for fine aerosols (FA) is generally greater than that for coarse aerosols (CSA). To avoid overlapping samples between fine and coarse aerosol-polluted conditions, it is important to establish an additional criterion beyond the AOD thresholds (PDF of higher 60%). Specifically, for a coarse (or fine) aerosol-polluted environment, the AOD

of coarse (or fine) particles must exceed 50% of the total aerosol AOD, as well as exceeding a specific AOD threshold. For example, for a case of a coarse aerosol-polluted environment, the coarse AOD must be greater than 0.0425, and the ratio of the coarse AOD to the total AOD must be greater than 50%. Therefore, there is no overlap between the coarse aerosol-polluted and fine aerosol-polluted samples.

In the revised manuscript, we have addressed more clearly the classification method of aerosol conditions in lines 211-215.

Additionally, when describing the samples, there are multiple values in the text that are inconsistent with the description in Table 1; for example, lines 196 and 204.

Response: Sorry for the carelessness in the previous version. The correct values should be 0.225 and 9785. These corrections have been made in the revised manuscript (Lines 211 and 222). Thank you.