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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Mixing layer transport flux of particulate matter in Beijing, China" *by* Yusi Liu et al.

Anonymous Referee #2

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The current study explores the seasonal source of PM2.5 pollution in Beijing by quantifying the transport flux based on measurements of mixing layer height and wind profile. In particular, this study raises two questions that are rarely addressed in previous studies: (1) effects of ventilation coefficient on PM2.5, and (2) observational quantification of transport fluxes. This topic is of broad interest to both the scientific community and policy-makers. The datasets analyzed in the study is valuable. However, the current analyses do not clearly address the questions raised in the beginning. In addition, the data and method section requires some clarification. Therefore, I recommend major revision.

Specific comments: 1. I suggest changing the second question to emphasize its scientific merit. By quantifying transport fluxes from observation, what scientific question do

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you want to address? 2. Section 2.2 describe the method to determine MLH. Although details are provided in earlier papers, necessary steps should be clearly mentioned in the current paper, e.g. line 113-115 averaging the profile over time? If so, over what time window, daily, hourly? 3. Section 2.4 cited a previous study to support the assumption that backscattering coefficient is relatively uniform in the mixing layer. I think your ceilometer observations include backscatter profile. Does your data quantitatively support this assumption? 4. On line 156-158 and following statements, what is the number behind the ïĆś sign? 5. I suggest using the same color scheme for each season in Fig. 2 and Fig. 3. 6. Why didn't you show diurnal variations and growth rates of PM2.5 in Fig. 2? It seems directly relevant to the first scientific question. 7. In Fig.3, it is worth discussing higher frequency of high VC (> 103 m2 s-1) in winter, is it due to high wind speed associated with frontal passage? 8. In Fig.4, it seems to me that the dominant southerly wind partly explains the positive correlation between wind speed and PM2.5 in summer. 9. I don't think the conclusion on lines 289-294 that southerly wind is "dirtier" directly comes from Figure 5 and 6 Flux variation comes from PM2.5 and wind speed, it could be that southerly wind are generally stronger. In order to demonstrate this point, it will help to add PM2.5 fields in Figure 5 and Figure 6. Another way to demonstrate this conclusion is to show wind rose and flux rose, and PM2.5 composite in different wind directions.

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