

Interactive comment on “Relationships between the planetary boundary layer height and surface pollutants derived from lidar observations over China” by Tianning Su et al.

Anonymous Referee #1

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This paper investigated the relationship between PBLH and surface PM concentrations over China. The interaction between PBLH and surface pollutants under different topographic and meteorological conditions has been carefully considered. However, I have some concerns about the conclusion of the paper. The authors have investigated many parameters that may influence the relationship between PBLH and surface PM concentrations. But all the derived correlations are relatively low. It seems risky to get the strong conclusion based on those correlations.

General comments:

1. Page 10. I recommend to put the introduction of MERRA in Section 2, which will

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make the flow more clear.

2. Section 3.1. The authors discussed the differences between CALIPSO and MERRA in detail. Will the differences influence the conclusion about the relationship between PBLH and surface pollutants? If so, how much will it be?

3. Section 3.2. The correlation coefficient is very low here (Figure 3). I guess it is too risky to make the statement that PBLH has negative correlation with PM_{2.5} without conditions, which appeared in both abstract and conclusion.

4. The authors use many figures in the supplement to support the discussion in the text. Meanwhile, the text is not self-explanatory without the graphs. I suggest the authors to reconsider the arrangement of the whole graphs including what has been included in the manuscript. You may want to delete the description that is not very relative or add some figures that are really necessary.

5. Section 3.6. I understand the authors would like to perform some preliminary analysis here. But exploring the feedback of absorbing aerosols by only analyzing the correlation between PBLH and PM_{2.5} looks not convincing for me. You may want to perform some further analysis to make the conclusion more solid or discard this part.

6. I suggest the authors to add the applications of the findings in the conclusion. How will the findings influence the model development or policy design in the future?

Specific comments:

1. Page 3, line 48, the term of “anthropogenic gases” sounds strange. Anthropogenic emissions?
2. Page 3, line 49, “they are much more visible”. Please clarify what are compared with.
3. Page 6, line 114. The grammar seems not proper.
4. Page 6, line 124. The source of the meteorological data is missing.

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5. Page 6, line 129. The reason for the usage of “noontime” day is missing.

6. Page 11, line 234. The English looks not proper in “The PM2.5 seasonal pattern is generally opposite that of PBLH”.

7. Page 11, line 238. The grammar seems not proper.

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