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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Effect of climate change on winter haze pollution in Beijing: uncertain and likely small" *by* Lu Shen et al.

Anonymous Referee #1

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This study provides new insights into the impacts of climate change on winter haze in Beijing. I have no doubt that this is an excellent study with significant contribution to the field. The authors show multiple lines of evidence and explain in detail why their results differ from previous studies. I recommend publication in ACP. Below are a few suggestions for consideration by the authors at their discretion:

1. Overall, the manuscript is well structured and the results are clearly presented, but I think the description of the methodology is so condensed that lots of details are not included, which could compromise the reproducibility of this work. For example, how did you construct the principle component for V805 and RH together? Also, it's not clear how you calculated the projected changes in PM2.5. What is exactly the 'PM2.5 vs PC1' relationship in Line 14 of Page 6? Is it calculated based on normalized value

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Discussion paper

(e.g. Figure 1d) or original value (e.g. Figure 1c)?

2. The authors conclude that the effect of climate change on winter haze in Beijing is likely small based on monthly average PM2.5 data, which reflect the mean state of PM2.5, but it's possible that climate change will have larger impacts on high PM2.5 events as shown in Cai et al., 2017. It's also possible that the distribution of PM2.5 will shift under climate change. I'd suggest the authors comment on how climate change would affect the high PM2.5 and the distribution of PM2.5, despite its insignificant impacts on monthly mean.

3. Figure 2e: The correlation coefficient is calculated based on 7 data points. The positive correlation may be just driven by the high value in 2013. I'm not convinced whether the conclusion is robust with so few data points.

4. Page 2 Line 25: Is observation from a single site regionally representative? Are there any other ground-based observations that can be used? How do they differ?

5. The authors have very detailed supplementary materials, and a lot of their discussions are based on the supplement. I actually spent more time reading the supplementary figures than the main figures, and I think many supplementary figures are worth including in the main text. The balance between supplement and main article is well suited for a letter style article. But for a research article at ACP, I'd suggest the authors consider moving some of important figures from supplement to the main article, so that readers don't have to keep referring to the supplement to follow the discussion.

Minor comments:

Page 4 Line 2: Period missing.

Page 4 Line 27: 'also is also' -> 'is also'.

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