

***Interactive comment on* “The Strengthening Relationship between Eurasian Snow Cover and December Haze Days in Central North China after the Mid-1990s” by Zhicong Yin and Huijun Wang**

Anonymous Referee #2

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This study discussed the effect of Eurasian snow cover on December haze days. Recently, severe haze occurs in the broad area of China, and the discussion of the relationship between Eurasian snow cover on December haze days is helpful to understand the mechanism modulation the formation of haze. The topic is interesting and I have a few questions listed below: 1. Line 124 The authors said “In contrast, the associated vertical velocity at the surface was upward, indicating an ascending motion near the surface.” I think the downward vertical velocity favors the haze formation due to weak dispersion conditions. The authors published a paper in 2017 (Atmos. Chem. Phys., 17, 11673–11681, 2017 <https://doi.org/10.5194/acp-17-11673-2017>), and in Figure 7, the omega was positive, and the authors stated that “Under their influence, there was

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a descending motion from 30 to 55_ N (Fig. 7),” and claimed this condition support the severe haze. Thus, the statement regarding the vertical motion in this study is somewhat contradicts with the previous study.

2. References: It is easier to read if a few spaces were left in front of the first line of each reference. Alternatively, a number can be used to separate each reference as well.

3. Line 59: “Basing on” should be “based on”

4. Line 100-103: The authors declared that “during P2, the snow cover with larger interannual variation was distributed widely and zonally”: do you have a figure displaying the distributions of the snow cover? It is hard to tell without a figure how the snow cover was spatially distributed.

5. There are a few places which did not clearly mention the figure number, which makes it hard to follow. For example: Line 145: In the first paragraph of the section 4 “possible physical mechanisms”, the authors should mention Figure 9 first, so the readers can follow the authors easily. Otherwise, it is hard to know which figure the authors are referring to. Line 176: RL1..., this information is from Figure 11a, so the authors should point out Fig. 11a immediately after the description.

6. Line 180: if there was more SCES, the absolute value of the net longwave radiation and net shortwave radiation would both be smaller. The signs of the correlations between SCES and net longwave radiation, SCES and net shortwave radiation are opposite. I am not sure why the absolute value of the net longwave radiation and net shortwave radiation would both be smaller when there was more SCES

7. Line 197: EAJS was shifted significantly northward Without a base location, how can this shift be identified?

8. The figure qualities and descriptions of captions need to be improved: For example: Figure 1: CCdt, CCOS should be explained in the caption. A figure is in principle can

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be independent from the paper. Thus, one should get all the information from the figure or caption without searching from the main text.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-1055>, 2017.

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