

Interactive comment on “Elevated dust layers inhibit dissipation of heavy anthropogenic surface air pollution” by Zhuang Wang et al.

Anonymous Referee #1

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Title: Elevated dust layers inhibit dissipation of heavy anthropogenic surface air pollution MS No.: acp-2020-379

Comments: The paper explains mechanism of the elevated dust layer enhances surface air pollution during persistent heavy air pollution events. This paper is thought to be helpful in understanding the phenomenon of high concentration of fine particle (PM_{2.5}) in winter and spring in Northeast Asia. The dataset presented is interesting and surely deserves publication. However, I am afraid the paper cannot be published as it is, as a number of points must be clarified. A detailed review follows:

Major Comments 1. The observation period of this paper is as short as 2 weeks. It is true that it produced important results for the generation and diffusion of yellow dust and pollutants, but it seems that it is difficult to generalize the results of the study due

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to the limited number of analyzes with a short observation period. Therefore, I hope there is an expression that the paper can be applied under special conditions.

2. In order to understand the overall content of the paper, it seems necessary to check the supplementary materials. Including some of the materials in the supporting materials directly in the paper seems to be more helpful in understanding the paper. In particular, Figure S2 should be included in the next of the Figure 4 in the paper. Figure S3 also should be included in the paper.

3. Figure S5. In Figure S5, Data comparison of RL and MAX-DOAS is shown. But, just shown as correlation plot. Since the paper indicates that MAX-DOAS can be observed at different altitudes with a resolution of 100 m, it would be wise to show a graph that is compared with a profile that includes altitude distribution of RL and MAX-DOAS instead of a correlation plot like Figure S5 (c) and (d). Also, Figure S5 should be included the paper in “2 Measurements and methodology” part.

4. Suggestion: Figure 2(a,b,d) and Figure 3, 4(b,c,d) are overlapping. It would be nice to remove Figures 3 and 4 and express them as one in Figure 2.

Technical comments; 1. Page 5 line 5: Please include explain of “VMR”.

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