

Interactive comment on “Long-range transport of mineral aerosols and its absorbing and heating effects on cloud and precipitation: a numerical study” by Y. Yin and L. Chen

Y. Yin and L. Chen

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response to Referee #2

We are very grateful to Referee #2 for the encouraging comments and suggestions which helped to improve the quality of the paper. A detailed response to the specific comments is given below:

1. The English grammar and style have been carefully checked and improved.
2. The title has been changed to “The effect of heating by transported dust layers on cloud and precipitation: a numerical study”, based on the Referee's suggestion.
3. The first sentence of the abstract has been changed as suggested by the Ref-

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eree.

4. Efforts have been made to make the text clearer and to improve the quality of the paper.
5. Based on the Referee's suggestion, we have added Israelevich et al. (2002) and Teller and Levin (2006) into the text and references therein.
6. A figure and a more detailed description have been added in the revised text to explain how the temperature increases introduced due to dust layer were tested in the numerical experiments.
7. We agree with the referee on that introducing dust at different levels would affect the way ice is formed. Actually, we have already carried out such numerical tests, and found that the results were very similar to those shown by Levin et al. (Levin Z., A. Teller, E. Ganor, and Y. Yin, 2005: On the interactions of mineral dust, sea salt particles and clouds - Measurements and modeling study from the MEIDEX campaign. J. Geophys. Res, 110, D20202, doi: 10.1029/2005JD005810) and Teller and Levin (2006, ACP). To focus our discussion on the heating effect, only the cases with enhanced ice-formation were included in this study, that is, in all the sensitivity cases, the changes in ice concentration produced due to the present of dust particles were considered already.
8. Units have been added to Table 1.
9. Additional information is given for Cheng et al. (2002) paper.
10. A reference (Bauer et al. 2007) has been added to show that coating of dust particles with soluble material increases their scattering.
11. The points raised by Dubovik et al (2002) and Costa et al. on the scattering and absorption capabilities of dusts in China have been added to the text.

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12. Sentences have been added to explain how the lower concentrations in maritime clouds affect the development of ice particles.
13. The sentence has been modified according to the Referee's suggestion.
14. Words have been added to mention the comparison of peak values.
15. "Heating rate" has been changed to "heating" in the revised version.
16. Figure 8 is removed as suggested by the Referee, and more explanations are added to the text.
17. All the figures can be enlarged by the editor to any sizes.
18. Yes, it is possible. But since both the dynamic structure and the microphysical processes are changed, it is hard to say whether this is the only reason.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 3203, 2007.

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