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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Airborne dust distributions over the Tibetan Plateau and surrounding areas derived from the first year of CALIPSO lidar observations" *by* Zhaoyan Liu et al.

Zhaoyan Liu et al.

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We appreciate all the insightful comments by the reviewer. We will revise the paper based on the comments. Our responses are provided below

Anonymous Referee #2

Specific comments: Page 5959, lines9-11: This is not necessarily true. The authors relate the observed warming in the TP to the possibility of positive radiative forcing by dust. This would, however, imply increased dust transport over this area in the past decades, for which they do not give evidence. Also, even positive forcing at TOA may be accompanied by negative surface forcing by dust.

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Author Responses: This is a good point. We will revise the paper accordingly.

It was not our intention to relate the observed warming in the TP to dust and imply an increased dust transport over the area, simply because (as the reviewer rightly notes) it is not necessarily true. In fact, studies [e.g., Qian et al., 2002] based on ground station observations indicate a decreasing trend of dust events in China for the past several decades. We therefore would not expect an increasing trend over TP. Our point was, both dust and pollution play an important role in regulating the climate over the area, as demonstrated by the simulation study by Lau et al. The impact of dust and pollution appear to be height dependent. The information on vertical distribution is important for a more accurate simulation. CALIOP provides a unique capability to profile globally dust vertical distribution. The most important contribution by CALIOP in this context is the vertical resolved distribution of dusts. We will rewrite the part to clearly reflect our points.

In the introduction the aerosol absorption is pointed out as critical factor for the dynamical effects of aerosols. While here the presence and absence of dust particles is derived from CALPSO measurements, this does not provide information on the absorption properties. Some suggestions on how to approach this knowledge gap for the region would be helpful.

Author Responses: Please also refer to our responses above. What we want to point out was that the dust is an important aerosol component over the area as demonstrated by other studies and CALIOP can provide the required vertical resolved measurement of dusts. We will revise this part accordingly.

Section 2: Please explain the term ‘ attenuated backscatter’ for the nonexpert reader

Author Responses: We will do.

Page 5965: Differences in the vertical extent of dust plumes from Gobi and the Tarim

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Basin area would be interesting and should be pointed out from the CALIPSO data, if possible.

Author Responses: We will do.

Figure 3, page 5966: The results that are presented in Figure 3 would be more useful if they were additionally presented in table format (e.g. with information on percent occurrence, per month for the different heights, for the eastern and western parts of the TP)

Author Responses: Yes, agree, we will do.

Page 5967, line 14: The influence of the Gobi desert on dust present in the TP appears to be very minor (which makes sense as the dust transport here is dominantly in eastward direction). This should be emphasized in the text.

Author Responses: Yes, this is a good point. We will do.

Page 5969, line 15: The look at the figures alone does not support the conclusion that the Tarim Basin is a more prolific dust source compared to the Gobi desert (however, it is of greater importance for the TP). This statement should be supported by actual numbers.

Author Responses: It is a good idea to provide numbers.

Figure 2: The map of the area would be more useful if the boundaries of the deserts would be indicated.

Author Responses: We will try but we are afraid that we do not know how to do this and therefore may not be able to do it.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 5957, 2008.

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