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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Analysis of cirrus cloud over the Tibetan Plateau from CALIPSO data: an altitude perspective" *by* Feng Zhang et al.

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Thank the authors for providing this interesting study. I just have two short questions.

1. Indeed, the gravity waves (GWs) frequently occur around the Tibetan Plateau and the GWs possibly contribute to the cirrus formation. However, I am afraid you have not proved that the cirrus is caused, or partly caused by GWs. In Fig. 2 and Fig.3a, the "gravity wave acceleration less than 0" from JRA-55 products(if it could be considered as an index of GWs occurrence) appears at the location with and without a large number of cirrus, which indicates that the GWs may have no relevance with the occurrence of the cirrus. So I do not think it is a very convincing explanation for the cirrus formation and maybe the causality between the GWs and the cirrus should be further justified.

The effects of the GWs could not be verified without talking about the amplitudes. Would you please include the figures of the GWs derived from the data and method of your choice? And would you please show the amplitude of the GWs?

And from my own experience, limited by the horizontal and vertical resolution, the reanalyses, even the ERA5, could not give a nice picture of GWs in the upper troposphere and stratosphere. I think high-resolution model simulations might be necessary for this study.

P.S. in Section 3, the statements about GWs from previous studies are mixed with your results. Even though the previous studies are nicely cited, it is difficult for readers to separate your results with others'.

2. All of the key elements, e.g., the subtropical jets and the OLR in the Northern Hemisphere, the convections at the Tibetan Plateau, the occurrence of the cirrus are substantially subject to seasonal variations. I would suggest you at least separate the situations between winters and summers.

Thank the authors again for the inspiring work.

Regards, Xue

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