Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2017-642-RC1, 2017

Atmospheric Chemistry and Physics Discussions

Interactive comment on "The impact of atmospheric dynamics on vertical cloud overlap over the Tibetan Plateau" *by* Jiming Li et al.

Anonymous Referee #1

Received and published: 30 August 2017

This is a very short review because there is a problem at the onset: the data product that is used to examine cloud overlap is said to be the "CloudFraction" product from the GEOPROF-LIDAR files. No other cloud product/data field is mentioned. In Mace et al., 2009 it is explained that this is the lidar only cloud fraction calculated when the lidar cloud detections are matched to the Cloudsat bins. Consequently, it is subjected to large attenuation in thick clouds or in conditions of multiple cloud layers in a column. When in section 2.3 the authors find a tendency for the discontinuous cloud layers to exhibit a minimum cloud overlap, this is expected when the lidar alone is used: the low level clouds will be more readily detected if there are no high clouds, so in situations of minimum overlap. And the same can be said in continuous cloud layer situations. So at this point none of the conclusions concerning specifically the Tibetan Plateau clouds

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Discussion paper

have any physical bearing other than variations in their optical thickness that pushed the overlap estimate towards minimum. What I would strongly advise the authors to do is to use the cloud base and top heights given in the “LayerBase” and “LayerTop” fields of the GEOPROF-LIDAR files and construct the cloud mask with these quantities. Then redo the whole study and see how different the results are.

When going back to the Di Giuseppe and Tompkins (2015) paper that the author refer to, this is clearly explain: they use either the radar alone or the radar with the additional information given by the “cloudfraction” field, not the latter alone.

Now, if I am mistaken and the dataset used here is in fact a combination of the “cloud-Fraction” product with some other radar information, then this is not clear and should be specified. However, in view of the results I have doubts that this is the case.

So at this point, I recommend major revisions to include radar information and redo the analysis. I do not think that it will take a lot of time, the analysis seems rather well presented and constructed, and the authors have already the data files with the relevant information.

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