

Interactive comment on “Diurnal cycle of clouds extending above the tropical tropopause observed by spaceborne lidar” by Thibaut Dauhut et al.

Anonymous Referee #2

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General Impressions:

This study uses the CATS lidar to estimate the stratospheric cloud fraction over tropics. The spatial distribution and the diurnal cycle of the stratospheric cloud fraction are analyzed and documented. The study also discusses the regional and seasonal differences of the stratospheric cloud fraction. The similarities and differences between their results and previous results are discussed as well. As this paper pointed out, it is a rare opportunity to study diurnal cycle of thin clouds based on the vertical cloud profiles. Therefore, I am overall supportive of the study. However, I feel the current manuscript needs a bit more detail (see some suggestions below). Therefore, I recommend this manuscript to be a major review.

Specific Suggestions: Figure 3: Comparisons between DJF and JJA are hard to in-
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terpret because the locations are differently selected by different seasons. Are the differences we see here due to the seasonal differences or due to the regional differences?

The paper concluded that the most of the findings are consistent with previous studies based on satellite observations, which means that the most of the findings are already known. I understand the uniqueness of this study is to use lidar instruments to understand the cloud fraction. However, the whole story feels a bit thin. Maybe compare the results with in-situ measurements to add more insight?

Also, more references are needed. For example, it would be nice to have some reference of in-situ measurements (line 23 to 24) and of decreasing low-stratospheric humidity (line 41-43).

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2019-770>, 2019.