

# Investigation of cirrus cloud properties in the Tropical Tropopause Layer using high-altitude limb scanning near-IR spectroscopy during the NASA-ATTREX Experiment

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## NOTE FROM THE AUTHORS

We would like to thank the anonymous reviewer #1, for the additional comments. The main text of the manuscript was modified following the reviewers' comments. We have provided a manuscript version with all the changes highlighted.

Please note that the title of the paper has been changed from:

*“Investigation of cirrus **clouds** properties in the Tropical Tropopause Layer using high-altitude limb scanning near-IR spectroscopy during the NASA-ATTREX Experiment”*

to:

*“Investigation of cirrus **cloud** properties in the Tropical Tropopause Layer using high-altitude limb scanning near-IR spectroscopy during the NASA-ATTREX Experiment”*

as it seems grammatically more correct the use of the word "cloud" instead of "clouds" in this context.

In the response to the reviewer, we addressed the questions/comments, pointing to specific changes in the manuscript.

Please see the uploaded version of the manuscript with the highlighted text for the changes made, and the following response to Reviewer #1 - Report #2.

## **Authors' response to comments from Anonymous Referee #1 – Report #2**

**Line 269-270** Any reason the 2DS measurements were not used to calculate the ice particle optical properties?

As explained in one of our previous answers to a similar comment, we are aware of the limitations of the use of the Hawkeye-FCDP data. This instrument only measures particles between about 1–50 microns, relying on the Hawkeye-2D-S to cover a larger size range (10 microns to a few mm). We performed sensitivity studies and found that inclusion of larger particles in the radiative transfer models yielded unrealistic results. We therefore believe that these particles may not have been present at large concentrations in the air volume observed by our instrument. We agree that a more accurate description of the particle size distribution would have been beneficial for the presented methodology, but we consider that constraining the size range of the in-situ microphysical data for more direct comparison with the SIWP retrievals to be acceptable, given the scope of the paper.

**Line 478** gr>g

We thank the reviewer for spotting this typo. The right format for the physical units has been corrected accordingly.