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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A cloud filtering method for microwave upper tropospherichumidity measurements" *by* S. A. Buehler et al.

Anonymous Referee #2

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General Comments

I have reviewed the manuscript "A cloud filtering method for microwave upper tropospheric humidity measurements," by S. A. Buehler, M. Kuvatov, T. R. Sreerekha, V. O. John, B. Rydberg, and P. Eriksson. The method is based upon an absolute threshold and also upon the difference in the brightness temperature between two of the 183.31 GHz channels of the Advanced Microwave Sounding Unit - B. The method is tested on a mid-latitude winter case-study.

The paper then builds upon the work of two of the authors who derived a method for estimating Upper Tropospheric Humidity using 183.31 GHz brightness temperatures. They examine different sources of bias in UTH climatologies, such as the dry bias that

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will occur when cloudy regions are excluded from the climatology.

This paper is in general well written. It is laid out in an orderly fashion, and the methodology is sound.

Throughout the paper the term 'brightness temperature' is used. Strictly speaking, the brightness temperature arises from applying an antenna pattern correction algorithm to the antenna temperature, which in practice is determined by applying the calibration coefficients to the instrument counts. Have the authors applied such a correction to the antenna temperatures? Is so, please give a brief description of the technique. If not, it will suffice to make a short statement to the effectĚ "While we have not applied an antenna pattern correction to the antenna temperatures, we will refer to these as brightness temperatures."

Specific Comments

Page 7513, lines 20-25. This section presents an explanation as to why a negative deltaTb18 value could be indicative of surface influence on Tb18. While there is a kernel of truth in this explanation, I find the overall reasoning to be unsatisfying. When I break down the respective terms of the radiative transfer equation in the deltaTb, I get terms that can easily counterbalance one way or the other. Please expand this section a bit, and perhaps show a figure that supports your argument.

Page 7514, lines 4-5. Please specify which version of RTTOV that you used, and make sure the accompanying reference applies to that version.

Page 7515, line 2. "Ě the similar scatter plot presented in BJĚ" Please give the exact figure number in BJ, so the reader doesn't have to guess when referring to that paper.

Page 7521, lines 17-19. Units for IWP are variously given in g/mˆ2 and mg/mˆ2, while in Fig 6 label it is given in Kg/mˆ2. Please use consistent units.

Page 7534, figure 6. Inconsistent units for IWP in figure axis label and figure caption. See above.

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7, S2674–S2676, 2007

Technical Corrections

Page 7515, line 11. Suggest re-write: “To put the results of the cloud impact in perspective,Ĕ.”

Page 7516, line 18. Suggest change “Ĕsize distribution of the cloud particles and their shape and orientation”Ĕ to “Ĕsize distribution of the cloud particles or their shape and orientation”Ĕ “Shape” and “orientation” cluster together, whereas “size distribution” is a separate category.

Page 7520, footnote. Note spelling of emission (emssion)

Page 7522, line 9. Suggest replacing “strong” with “heavily laden”. Similarly on page 7523, line 2.

Page 7522, line 16. Suggest replacing “strong” with “intense”

Pages 7527-7526, Tables 2&3. The superscripts and subscripts on UTH run into each other. Please space the rows out in the vertical so that the reader can easily discern which is a superscript and which is a subscript.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 7509, 2007.