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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Tropical thin cirrus and relative humidity observed by the Atmospheric Infrared Sounder" *by* B. H. Kahn et al.

Anonymous Referee #1

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This manuscript reports on the tropical thin cirrus and relative humidity derived from the Atmospheric Infrared Sounder (ARS) measurements. Overall, the manuscript is well organized and clearly presented. No major technical errors are founded, and the results are reasonable. The topic addressed in this manuscript is appropriate for Atmospheric Chemistry and Physics and should be of interest to atmospheric researchers. This reviewer recommend that the manuscript be formally published after some minor revisions. Below are the reviewer’s specific comments for the authors’ consideration.

(1). The first paragraph of the introduction where the importance of cirrus: D. K. Lynch, K. Sassen, D. O. Starr and G. Stephens (Eds.), Cirrus, (Oxford Univ. Press, New York, 2002) should be cited.

(2) There are several definitions of the effective particle size in the literature. To prevent potential confusion, the authors are suggested to provide the definition of the effective particle size, which is 3/2*total volume/total projected-area [Eq. (4) in Yue et al. 2007].

(3) Sec. 2.3 “Potential biases in thin cirrus retrievals”: In the retrieval algorithm developed by Yue et al. (2007), scattering effect is neglected, as is evident from Eq. (1) in Yue et al. (2007). Can the present authors comment on the potential errors due to this approximation? In the literature, all the IR-based retrieval algorithms assume that scattering effect is small. But quantitative information is usually not offered.

(4) Sec. 3.3 “Vertical structure and thin cirrus and RH_ic”: A recent study (Hong, et al, 2007: The sensitivity of ice cloud optical and microphysical passive satellite retrievals to cloud geometrical thickness, IEEE Trans Geosci. and Remote Sensing, 45, 1315-1323) shows that the IR-based cirrus property retrievals are quite sensitive to cloud physical thickness.

(5) Thin cirrus optical thickness can also be derived from the MODIS 0.66 and 1.375 bands (e.g., Meyer, 2007: Tropical ice cloud optical depth, ice water path, and frequency fields inferred from the MODIS level-3 data Atmos. Res. 85, 171-182). It could be of interest to compare the distribution of cirrus clouds derived from the present AIRS algorithm and the MODIS 0.66/1.375-um method. Additionally, could the authors briefly comment on the advantages/disadvantages of the IR and VIS/NIR algorithms?

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 16185, 2007.