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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Retrieval of upper tropospheric water vapor and upper tropospheric humidity from AMSU radiances" *by* A. Houshangpour et al.

Anonymous Referee #2

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General Comments

The paper is well written and describes a sound and useful method to retrieve UTH and UTWV from AMSU measurements. It has an advantage of speed and ease of implementation over variational retrievals. It does rely on certain approximations, and on regressions versus model profiles, but these assumptions are all explained in the paper. I have made some suggestions but I do not believe any major changes are necessary.

Specific Comments

p. 1554, line 4. A limitation of the method is due to the assumptions that must be made, such as water vapor density decreasing exponentially with altitude. While this is a good approximation, it may not represent all the variability in the real data.

p. 1557, line 14: UTWV is defined earlier as the water vapor between 500 and 200 hPa, but in Equation 8, it is from 500 hPa to the top of the atmosphere. While the amount of water vapor above 200 hPa is relatively small, you should be consistent in your definitions.

Section 4: If you already have UTWV, T_0, and β, can't you compute UTH more directly from your known temperature and moisture profiles? How does this method (using only one of the two channels) compare to the method of Section 4, using both channels? In other words, is the extra complexity warranted, particularly since UTWV is the more meaningful and useful quantity anyway?

Section 6. The comparison against radiosondes provides a good validation, although it is restricted to the range of atmospheric conditions present at Lindenberg.

Technical Corrections

p. 1560, line 6. Isn't partial pressure of water vapor usually denoted e?

p. 1563, line 19. Clarify that you are excluding beta greater than or equal to -.003 K/m. (I think that's what you mean.)

p. 1566, line 2. This is inconsistent with the previous lapse rate criterion in Section 5.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 1551, 2005.