

Interactive comment on* “The effect of cloud liquid water on tropospheric temperature retrievals from microwave measurements” *by Leonie Bernet et al.

Anonymous Referee #3

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Comments to the manuscript: "The effect of cloud liquid water on tropospheric temperature retrievals from microwave measurements" by Bernet et al.

The authors analyze the effect of including cloud liquid water in the retrieval of temperature profiles and estimate the improvement to the profile caused by including a cloud model to the profile.

I must admit I am a little bit puzzled by the results and conclusions presented in section 5.3.2. Although I agree with the results that show that including LWP in the retrieval improves the temperature profiles (because it includes frequencies that are sensitive to the presence of liquid water) the results relative to the sensitivity of the retrieval to the liquid water distribution in the clouds contradict previous studies. For example, Crewell et al. (Geophys. Res. Lett., 36, 2009) showed that there is no sensitivity of microwave

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brightness temperatures to the CLW profile. I am sure that the ILW retrievals used in the present paper are derived under that assumption. If there were such a sensitivity a LWC profile should be provided to retrieve ILW and IWV as well.

In my opinion to support the conclusions, the perturbation on the brightness temperatures caused by the various liquid profiles should be presented and it should be assessed whether the magnitude of such perturbation on the brightness temperature is large enough to justify the effect on the temperature profile retrieval.

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