Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC2
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Comment on amt-2021-397

Anonymous Referee #2

Referee comment on "Determination of atmospheric column condensate using active and passive remote sensing technology" by Huige Di et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-397-RC2, 2022

This paper demonstrates a very interesting combined observation of atmospheric column condensate by using lidar, microwave radiometer, and millimeter-wave radar. The case study presented in this work opens up the feasibility for future research on the hydrologic cycle and the assessment of cloud water resources. The paper can be published after addressing following issues:

- Since the abbreviations for microwave radiometer and millimeter-wave radar are similar, I would suggest use their full names in the whole manuscript. I was often confused about which technique MWR is referred to.
- Figure 2, maybe the coherent Doppler lidar should be removed from this figure, as it is not utilized in the present work.
- (13), I am not sure whether the number “237.3” is correct or mistyped.
- Figure 8, maybe it is worth to add the cloud top in figure 8(a), particularly the part utilized in the evaluation.
- Figure 9, it is better to add the information about the measurement technique for the temperatures at the cloud base or top in figure legends. On the other hand, what about the temperature at the cloud base measured by the microwave radiometer? Could that be used for the evaluation?
- What about the measurement uncertainty of the vertical wind velocity, which seems to play a significant role on the final flux?
- In this work, the author utilizes the saturated water vapor density for the evaluation. Could it be feasible to utilize the humidity measured by e.g., DIAL for the evaluation, which may improve the accuracy? A brief discussion about the feasibility could be valuable.