Response to reviewer #2

General Comments:

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.

Answer: We appreciate the reviewer's thoughtful review and constructive comments. All the comments have been addressed in the revised manuscript, and the responses to each comment are given below.

Special Comments:

1. 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.

Answer: Indeed, the abbreviations of these two devices are easy to be confused. We accepted the suggestions of the reviewers and used their full names in the text.

2. Figure 2, maybe the coherent Doppler lidar should be removed from this figure, as it is not utilized in the present work.

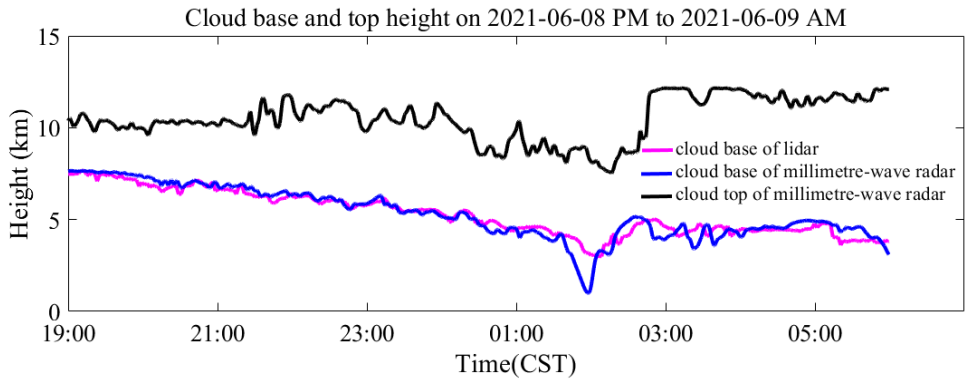
Answer: "coherent doppler lidar and MWR" has been modified as "millimeter-wave radar or coherent doppler lidar". Both devices can be used to detect the air velocity at the cloud boundary. In this paper, the authors chooses to use the data of millimeter wave radar.

3. (13) ,I am not sure whether the number "237.3" is correct or mistyped.

Answer: The author confirmed that "237.3" is correct in equation 13.

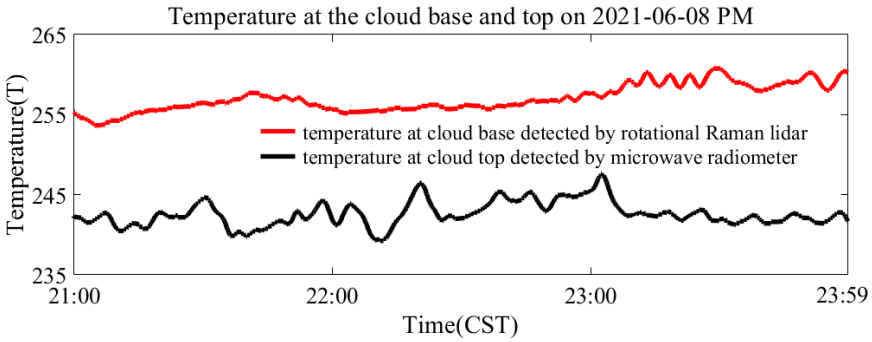
4. Figure 8, maybe it is worth to add the cloud top in figure 8(a), particularly the part utilized in the evaluation.

Answer: The cloud top of millimeter-wave radar in Fig. 8 has been added.



5. 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?

Answer: It has been noted in Fig. 9 that the temperature at the cloud base was detected by rotational Raman lidar, temperature at the cloud top was detected by microwave radiometer.



6. What about the measurement uncertainty of the vertical wind velocity, which seems to play a significant role on the final flux?

Answer： The vertical wind velocity plays a significant role on the water vapor flux and condensate. The uncertainty of the millimeter wave radar used in this paper is 0.3m/s. If Doppler lidar is used, the uncertainty of wind speed detection can reach 0.1m/s.

7. 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.

Answer: If the water vapor density at the cloud bottom can be measured, it can also be the evaluation of condensate. The authors have compared the calculated saturated water vapor density at the cloud bottom by using temperature, which is consistent with the measured water vapor density at the cloud bottom by using water vapor lidar. It is difficult for lidar to detect water vapor in the day, it is difficult to obtain the water vapor density at the cloud top. While the measurement of temperature is relatively easy.