Response to Reviewer 2' Comments

Comments on "Characterizing the near-global cloud vertical structures over land using high-resolution radiosonde measurements" by Xu et al.

We thank the reviewer for his/her comprehensive evaluation and thoughtful comments, which help tremendously to improve the quality of our work. We have tried our best to address the reviewer' concerns one by one. For clarity purpose, here we have listed the reviewer' comments in black, followed by our responses in blue, and the modifications to the manuscript are in italics. We sincerely hope that the reply and the revisions can satisfy the editor and referee' expectations.

Specific Comments:

1. L69-70: The last sentence appears to be repeated twice here. Remove one of them.
Response: Thanks for pointing out this mistake. We deleted one of the sentences in the revised version (Manuscript_tracked.docx).

2. L204-206: It's probably best to move these sentences into the next paragraph so it flows more smoothly. You can also remove the sentence "The detailed description of this method proceeds as follows:"
Response: Thanks for your great suggestions. We deleted the sentence "The detailed description of this method proceeds as follows:" and moved the sentence "In order to improve the accuracy of cloud detection, we develop a CVS retrieval method by combining the vertical gradients of *RH(z)* and *T(z)* and altitude-dependent thresholds of RH as well." into the next paragraph in the revised version (Manuscript_tracked.docx).

3. Section 2.2.3.: Given this subsection is quite short, I think it would flow better to rewrite this as a short paragraph as opposed to a 2-item list as currently presented.
Response: Thanks for your great suggestions. We changed the 2-item list to a short paragraph in the revised version (Manuscript_tracked.docx), as follows:
"To obtain robust cloud structures, the cloud layers determined above have to be further reprocessed. *If the distance between two contiguous cloud layers is less than 300 m, or the min-RH between the continues cloud layers is greater than the corresponding minimum RH threshold (inter-RH) between the consecutive cloud layers (Table 2), these two cloud layers are merged (Zhang et al., 2010).*"

4. L597: This is overstated a bit. These results could be used to validate output from global climate models, as constraints for cloud formation would need to be done inside a parameterization. I also think you should add a sentence in this paragraph stating that these results can also be readily used by the operational weather community given the widespread use of radiosondes in day-to-day forecasting operations.

Response: Thanks for your kindly reminder. Here, we revised the sentence “The results of CVS provide a valuable addition to the study of cloud-radiation-dynamics interactions and have the potential to improve the performance of current climate model.” as follows:

“*These results of CVS could be used to validate output from global climate models, as constraints for cloud formation would need to be done inside a parameterization. In addition, these results can also be readily used by the operational weather community given the widespread use of radiosondes in day-to-day forecasting operations.*” in the revised version (Manuscript_tracked.docx).