General

This paper analyses cumulus cloud cover over China with a focus on the difference between the Tibetan Plateau and regions with less topography. Finally, results are compared with the North American region. It is found that topography has a triggering effect which is more pronounced over the Tibetan Plateau than over the Rocky Mountains because of the larger impact of subsidence in the latter region.

This is in principle an interesting topic, but I find that the presentation needs much improvement before its publication. My major concerns and some minor points are described below.

Major revisions

- The considered topic is not new and the differences to existing literature should be better described. New findings should become clearer. Especially, the differences to Wang et al. (2020) need to be explained who also studied the Tibetan cloud cover. Figure 5 is shown in the same way in Wang et al. (2020) but this is not mentioned. What is new here?
- I have difficulties to understand the principle idea. Why should the TKE budget at the surface play the most important role for cloud cover? I can follow that the near-surface buoyancy flux is important and also the near-surface shear stress is important for the PBL height, but there are many other impact factors influencing clouds such as aerosol, large scale forcing etc. Also, there are other sources of turbulence especially at cloud top and condensation level which might have an impact.
- Before equation (3) occurs, it must be clearly said that in the following the determination (iterative scheme) of the surface fluxes is explained. But the equations
are incomplete. The characteristic temperature scale (theta_star occurring in the Obukhov length) must be involved, otherwise the system cannot be solved and neither friction velocity nor heat flux can be determined. I guess, equation (6) is for heat? Equation (7) does not involve humidity, which is in contrast to equation (3).

- It is several times repeated that there are organized structures (cellular convection) (e.g. in lines 162, 163, 231). What is the basis for this conclusion? I expected at least a satellite image showing the typical cell structure and the cumulus clouds which are described as ‘popcorn-like’.
- When the goal is to compare results in China with those in North America then a similar Figure 1 should be shown for North America.
- Please explain results showing wind vectors in Figure 2. There is no unit given, but at present I must conclude that mean vertical velocities are in the order of 4 m/s (at least the same order as horizontal wind). But they should be close to zero. Or what is the reason for the permanent strong upward wind over the Tibetan Plateau?
- The definition of the PBL is unclear. In Figure 3, it seems that over long distances LCL and PBL are at the same level. But usually, shallow cumulus at least is part of the PBL. Cloud base is at LCL but the rest of the cloud above it.
- Figure 7: According to the figure, the authors seem to consider deep convection. But this is not clear from the beginning of the paper. ‘Cumulus convection’ is referring to shallow convection as well. Please specify already in the introduction, which kind of convection is considered. Figure 7 would give a wrong impression when the paper addresses also shallow convection.

**Minor revisions**

Line 54: why does decreasing RH favors the formation of clouds?

Line 96: replace ‘obscured’ by ‘covered’

Line 150: add that the figure is based on reanalysis

Line 152: what is an ‘in ribbon’ pattern?

Line 152: better show a map with the Tibetan Plateau and Yangtze River valley or add this explanation in an existing figure

Figure 2: Explain all abbreviations (ASL, AGL and others). Show this figure also for North America.

Figure labels: the quality of figures needs improvement. Labels cannot be read in some
Figure 3, caption: What means ‘latitude across section’? Sentence starting with ‘The vectors’ is incomplete. What are the units of wind? What is the definition of PBL used here? Give units of gradients.

Figure 4: length of axes should be the same as in Figure 1. It is the same region?

Line 247: Is it adequate to compare the measurements of Brümmer over sea with measurements over land? What is the typical cloud cover in the study of Brümmer? Please give roughly numbers for BT measured by Brümmer and found for TIPEX III.

Figure 6: Please, mark the regions, which are compared, at least in one of the different panels.

The paper needs language corrections with respect to grammar, e.g. many articles are missing, and often plural should be used instead of singular.