This paper investigated the impact of varying soil temperatures on potential air temperatures in an idealized domain using a model for different scenarios. This is an interesting and certainly fits into the scope of the journal. The method presented is clear, and the results are also well discussed. However, some issues presented in this investigation need further exploration. Therefore, I suggest minor revisions before accepting the paper for publication. My comments are as follows:

1. My biggest concern is why the bottom layer air potential temperature generally had so huge differences with the topsoil temperature (0.005 m depth), as shown in Figs. 5 (b-e)? The difference between the bottom layer air temperature and topsoil temperature is up to about 15 ℃ in Fig.5c. Because of the continuity of temperature, I think the topsoil temperature should be same or much close to the bottom air temperature, as shown in the below figure.

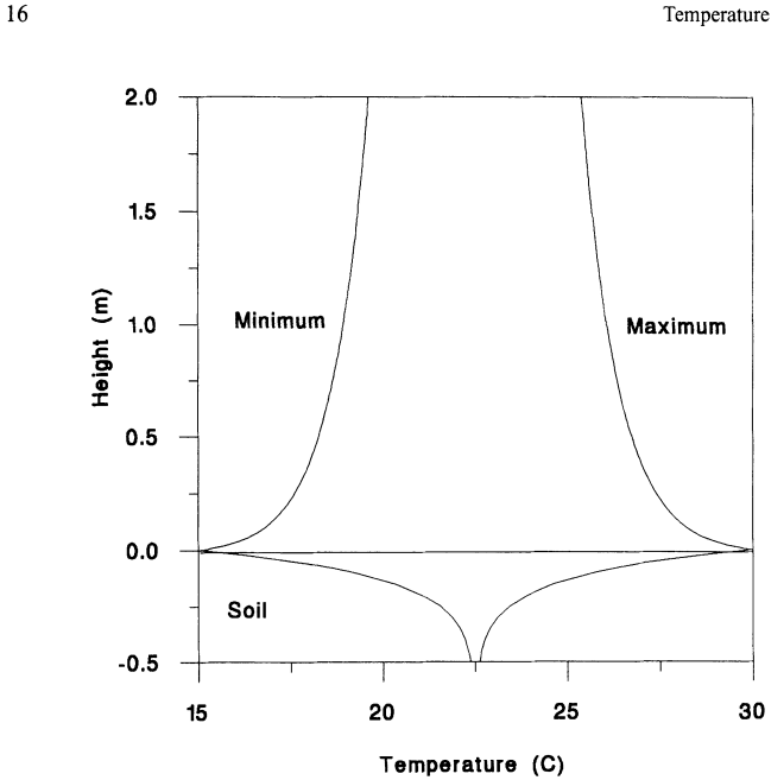

FIGURE 2.1. Hypothetical profiles of maximum and minimum temperature above and below soil surface on a clear, calm day.

(Reference of the figure: Campbell and Norman, 1998, An introduction to environmental biophysics, chapter 2, Page 16)

2. Please define how “Δ Air temperature” in Figs. 5-7 a was calculated.

3. Line 97, please add additional text to state how these variables are automatically prompted (or estimated).

4. In Table 2, the vertical humidity gradient is shown for the given heights. The air humidity and temperature are coupled. It would be interesting if the results of humidity profile are shown and discussed for different scenarios. How did humidity profile change for different scenarios? what the potential roles of humidity on the air temperature changes?

5. Lines 341-342, why deep soil temperature modifications impact the potential air temperature differently? Please add some potential reasons.

6. Lines 339-341, “The highest absolute temperature and the highest offset between … the lack of vegetation and thus evapotranspiration (Brunsell et al., 2011)”. It seems that there is an assumption that the soil moisture of bare soil is less than that of grass soil. It is highly recommended to add additional text to clarify some assumptions.

7. Line 346, “when temperature are cooler” -> “when soil temperature are cooler”.

8. Line 355, explain why “The atmosphere responds more to colder temperature”.

Format:

9. Line 71, there is an edit error. Change “PALM-4U?;” ->“PALM-4U;”

10. Please maintain consistency of potential temperature units in Figures 2, 5-7. In Fig.2, the x-label is “Θ Air temperature [°C]”, while the x-label is “Potential temperature [°C]” in Figs. 5-7 b-e.

11. In Figs. 5-7 b-e, the x-label is for air potential temperature and soil temperature. It is not strict by using “Potential temperature [°C]” for both soil temperature and air potential temperature.