We highly appreciate your valuable review and helpful comments. Our reply is as follows:

General

This is a generally well-written paper that deserves to be published after some moderate revisions. The paper deals with the question whether shallow groundwater levels results in anomalous surface temperature such these can be detected from space using thermal remote sensing. It is a very important question as up to now, apart from indirectly by a change in large-scale groundwater storage, groundwater absolute levels have never been remotely observed. In this paper an integrated transport of soil moisture, soil vapour and soil heat transport and land surface-atmosphere energy exchange is used to investigate this. And to a larger part, it has been convincibly answered by this study. To fully answer this question though, some more work and discussion is required.

More work:

- The authors compare two cases, one with a fixed groundwater level and one without a groundwater table. Both cases are extensively discussed in terms of where the differences come from and the physical explanation thereof. Although very thorough, the extent of the discussion of comparing these two cases could be shortened to make room for answering an additional question, namely: at what groundwater depths, which texture and which times of the year can we observe groundwater from space? This could be done by performing a set of runs where for say three textures: clay, sand, loam and for 5-10 different groundwater depths runs are made and then plotting for each case and for each month the minimal and maximum difference of surface temperature with the non-groundwater case. Also plotted should be the dryness index for each month. This way, much more would be known about the applicability of remote sensing to detecting water tables.
- We will enrich the paper by conducting and discussing three more numerical experiments to explore the critical depth of detection for three types of soil (i.e. clay, loam and sand).

More discussion:

- Although briefly mentioned, the model has only been developed for bare soil in summer dry climates (with high dryness index). What if where to be applied to more vegetated surfaces and wetter climates. Some speculation about the prospects of using remote sensing for these circumstances should be put in the discussion part.
- We will enhance the paper by this discussion.

Minor remarks

- Abstract, line 10: replace “the get higher magnitude of” by “receive more”
- Abstract: lines 17-20: Condition should be added: no vegetation.
- Page 8643: recent coupling of full fledged groundwater models to land surface models at large scale were also published in HESS:
- Page 8643, line 23: replace “undertook” by “tackled”
- Page 8645: Equation 2: why is there an emissivity in incoming long-wave radiation? I would expect an albedo, but not an emissivity.
- Actually, this emissivity behind the incoming longwave radiation refers to the surface absorptivity which is equal to the emissivity according to Kirchhoff's law of thermal radiation. On the contrary, albedo usually refers to the reflectivity within the visible light range (shortwave radiation).

- Page 8647-8649: It seems that equations (3)(5), (6), (7), (8), (9) should be solved conjunctively by iteration? Is this true? If so, please mention this. An as the surface temperature is also in the surface energy balance, are equation (10), (11), (14), (17) also involved in the same iteration?
- This is true; the state equations describing energy and water balance are solved simultaneously using an iterative technique. Those state equations involve all the terms described in the equations you mentioned. We will clarify this more in the text.

- Page 8651, line 25: put :a: before “temperate”
- Page 8657, line 18: replace “big” by “large”
- Page 8658, line 5: place “a” before “wetter”
- Page 8658, line 9-10: replace “get higher magnitude of” with “absorb more”