Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2020-199-AC2, 2020

Hydrology and Earth System Sciences
Discussions
Open Access
EGU

Interactive comment on "Simulation Analysis of Local Land Atmosphere Coupling in Rainy Season over a Typical Underlying Surface in the Tibetan Plateau" *by* Genhou Sun et al.

Genhou Sun et al.

sungh6@mail.sysu.edu.cn

Received and published: 5 September 2020

Thanks for your precious comments and they are very helpful to perfect our manuscript. With your precious comments, we have checked the data and figures carefully and respond to your comments and sincerely hope our responses could answer you're your questions.

Reviewer Response 1: It is clear that the red area represents lakes. The authors state that the rest of the domain varies from 0.2 to 0.5. This is not shown in the figure. There are plenty of gridcells that are light green and yellow. Given the scale presented in the figure, the case could be made that the darker green gridcells are around 0.5, but the

Printer-friendly version

Discussion paper

bright green and yellow values are certainly greater than 0.5 and they are plentiful. If it is true that these values are not greater than 0.5, then this figure needs to be revised to convey that information. As it exists now, it does not support the text and my previous comments and concerns remain about this derived map and the impacts of it on the simulations. Response: Thanks for your comments. We have checked the data of Fig. 2 and found that there are 49 grids (0.5% of all the grids in the study area) with the soil moisture ranging from 0.50 to 0.95 m3/m3. The reason for these grids with the soil moisture ranging from 0.50 to 1.0 m3/m3 is caused by the fitting relationship between soil moisture and vegetation index from MODIS in Fig. 2 a. The relationship is applied to the leaf area index (LAI) of MODIS to obtain soil moisture which is more realistic than that obtained from ERA-Interim using the WRF Pre-Processing System (WPS). Luckily, there is a very small percentage of grids with soil moisture over 0.5.

Reviewer Response 2: Regarding "Fig. 8 shows that the soil is dry in the west and south parts of the study area and is generally wet in the middle and east parts of the study are and the areas close to the lakes." The annotated figure showing the areas of low and high soil moisture is appreciated. Although there is slightly more blue (lower SM) in the southern part of the domain as compared to the northern part, it's still very difficult to see any significant groupings of soil moisture. It would likely help to set the minimum value of the scale/map to a larger value (e.g., 0.2 rather than 0.1) so that more variation can be identified between 0.2 and 0.3 where most of the values are. As it stands, it still looks as if the domain (aside from the lakes) lacks any coherent soil moisture pattern. Response: Thanks for your comment. Fig. 8 shows that the soil is dry in the west and south parts of the study area and is generally wet in the middle and east parts of the study are and the areas close to the lakes. Generally, the spatial distributions of mean Hsfc and LEsfc are consistent with that of soil moisture at large scales, although the details of the spatial distribution of mean Hsfc and LEsfc do not agree very well. One possible reason for the weak agreement at small scales is that this is a comparison between the average Hsfc, LEsfc, and soil moisture from 08:00 to 17:00. It is very likely that the averages over 10 hours smooth the details in

the spatial distribution, especially for the Hsfc and LEsfc. This is because the fluxes in the daytime vary significantly due to the daily evolutions of solar radiation as well as the presence of clouds, while the soil moisture in the study area shows very small changes. Therefore, the details of the spatial variability in the Hsfc and LEsfc are very likely to be smoothed in the studied area, leading to the fact that the details of the spatial distribution of mean Hsfc and LEsfc do not agree very well with that of the soil moisture at small scales, as shown in Fig. 8. We have tried to change the range of the scale of soil moisture in Fig.8 and it seem that the range from 0.1 to 0.5 could represent the details of the spatial distribution of the simulated soil moisture, which is shown below.

Please also note the supplement to this comment:
https://hess.copernicus.org/preprints/hess-2020-199/hess-2020-199-AC2-supplement.pdf

---

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2020-199, 2020.

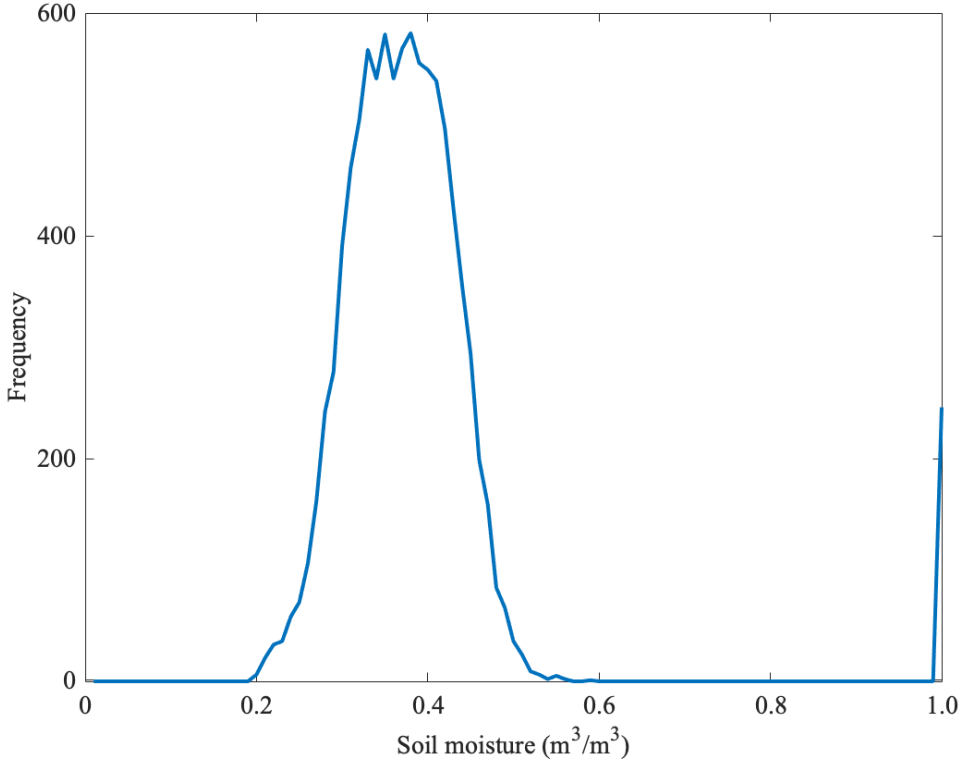

Fig. 1. Frequency distribution of soil moisture of the study area. There are only 49 grids with soil moisture ranging from 0.5 to 0.95, which are mainly caused by the linear fitting relationship in Fig. 2 a i

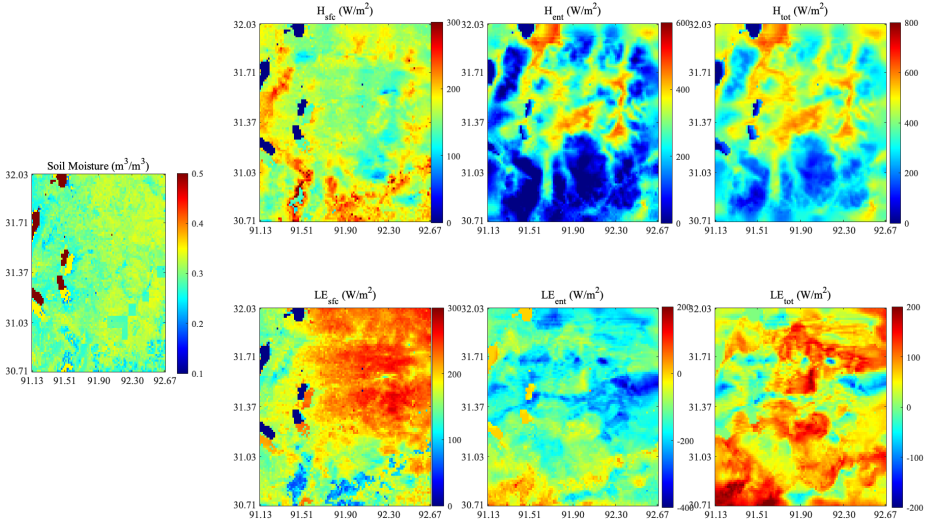

Fig. 2. Fig. 8 Spatial distribution of mean soil moisture and PBL energy budgets simulated using WRF with Noah-BouLac

Printer-friendly version

Discussion paper