

## ***Interactive comment on “Land Surface Model Representation of the Mutual Information Context between Multi-Layer Soil Moisture and Evapotranspiration” by Jianxiu Qiu et al.***

### **Anonymous Referee #1**

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Evapotranspiration is one of the most important land flux extracting water from the soil. Its estimation is particularly challenging and many different type of techniques have been used which utilize either energy balance or coupled energy and water balance also including elements of the carbon cycle. Several ET estimation techniques have already been developed which differ in their data requirements, the approaches used to derive them and their estimates (simplified models, remote sensing and so on), yet it is not clear which provides the most reliable estimates. For models the main issues concern the different assumptions and simplifications made which can significantly alter the final ET estimates. For these reasons the present study is important and needs to be considered for potential publication on HESS.

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The manuscript is well written and well structured. It does not contain significant issues. I only have one comment for one issue which I think the authors should consider. In the study I did not find any particular discussion related to the type of vegetation characterizing the Ameriflux sites and its effect on the result. I think that vegetation type can be relatively important as for example grass roots are shallower with respect to tree and shrub roots and thus can exert potential different effects both on the coupling strength between the soil moisture profile (surface vs root zone) and on the transpiration flux itself also considering that transpiration is the dominant pathway for the total Evapotranspiration and is estimated to account for two-thirds of global land ET based on flux tower measurements (Schlesinger and Jasechko,2014). Based on that the authors should provide at least a discussion on the potential effects of the vegetation type on the presented results.

I have included additional comments on the annotated pdf.

Schlesinger, William H., and Scott Jasechko. "Transpiration in the global water cycle." *Agricultural and Forest Meteorology* 189 (2014): 115-117.

Please also note the supplement to this comment:

<https://www.hydrol-earth-syst-sci-discuss.net/hess-2019-282/hess-2019-282-RC1-supplement.pdf>

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2019-282>, 2019.

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