

Review for Hydrology and Earth System Sciences Manuscript #: HESS-2019-305

Weak sensitivity of the terrestrial water budget to global soil texture maps in the ORCHIDEE land surface model

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Overall Comment

This study investigates how a land surface model behaves against different global sets of soil parameters in terms of the terrestrial water balance. The experiment configurations follow the protocol of an ongoing international project, Soil Parameter Model Intercomparison Project. It concludes that the choice of the soil texture map is not crucial for large-scale modeling. The manuscript is well-written in a concise form, and their findings are important to our community. I encourage the HESS journal to host this study, but the current version of the manuscript would not be at level to be accepted because of some hasty explanations and not enough interpretation and discussion.

Specific Comments

- # 13 : “medium texture” is not a clear term here.
- # 16 : Please provide reason or speculation why it “is not crucial”. If not, it could mislead readers to consider soil parameters are not important, which is not true.
- # 81 : Please add data citation for GSWP3-v1
H. Kim. (2017). Global Soil Wetness Project Phase 3 Atmospheric Boundary Conditions (Experiment 1) [Data set]. Data Integration and Analysis System (DIAS).
<https://doi.org/10.20783/DIAS.501>
- # 93 : Rather “coarse and fine” than “medium and extreme”?
- # 133 : Please add the definition of “soil-moisture” which is sampled from each soil texture class which has a similar range of precipitation. Also, specify the sampling depth; top-soil, root-zone, full-column or any specific depth?
- # 142 – 145 : Please provide additional information how the model treats the root uptake and root-zone soil-moisture. Also, speculations on the role of groundwater capillary action would be a very important aspect, too.

- # 149 : How does leaf area index affect soil evaporation; interception loss, radiative transfer in canopy? Citing previous research would be helpful to show soil evaporation “strongly depends on other factors”.
- # 158 – 163 : Only a part of Figure 4 has been touched. I suggest the authors to add in-depth interpretation of this figure. For example, the change of evaporation could be compared with of soil-moisture – (transpiration + total runoff). It is not recommended, but to discard this paragraph and Fig. 4 would be another option.
- # 175 : “coarse or clay” would be “coarse or fine” or “loamy sand or clay”.
- # 175 – 177 : To me, evapotranspiration of EXP6 and EXP7 also seem out of the observed range.
- # 182 – 183 : Please specify regions.
- # 185 – 186 : To me, it does not seem to have a larger variability to the other fluxes (e.g., total runoff), particularly.
- # 209 : Please add “at the global scale”.