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Comment on hess-2021-394

Anonymous Referee #3

Referee comment on "The importance of vegetation to understand terrestrial water storage variations" by Tina Trautmann et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-394-RC3, 2021

Comments for hess-2021-394 “The importance of vegetation to understand terrestrial water storage variations” by Trautmann et al.

The authors compare a model experiment with vegetation parameters varying in space and time to a baseline experiment in which all parameters are calibrated as static, globally uniform values to investigate the effect of vegetation-dependent parameterizations of key hydrological processes on TWS partitioning. I think this work is valuable and of interest to the greater community, and the manuscript is generally well written. The paper can be accepted after addressing my following concerns.

Major Concerns:

- This paper mainly focus on investigating the impact of “space and time varying vegetation parameters” on defining infiltration, root water uptake and transpiration processes and decomposing the TWS. It sounds strange to use the words such as “importance of vegetation”, “including vegetation”, “including vegetation characteristics”, “including vegetation data” and “contribution of vegetation”. These words cannot reflect well the research objective, and I think the impact of vegetation/vegetation characteristics/ vegetation data is also embedded within the baseline experiment using the static and globally uniform parameter values.
- The authors calibrate and validate the model performance almost for the same period (01/2002-12/2014 vs. 03/2000-12/2014). From the view of traditional calibration and validation procedure, it will be better to use part of the observations (e.g. period of 2002-2008) to calibrate the model, and then using the remaining observations (e.g. period of 2008-2014) to validate the model.
- For the regional analysis of model performance, the authors derive 5 hydroclimatic regions by performing a cluster analysis, but it sounds strange to treat almost the whole China and Europe as the same group, i.e., the moderate mid latitudes (Temperate). This is contrast to the common sense. The authors are thus suggested to use a better classification such as the Köppen–Geiger climate classification.

Minor Comments:

- The title of Section 2 is wrong and the structure of this section can be improved. E.g., “1.1 Methods” should be “2 Methods”, “1.2 Overview” should be “2.1 Overview”. In addition, it’s suggested to modifying “2.2.1” to “2.3”.
- It’s suggested to modifying all the tables to the standard table format.
- Line 410: “Fig. 2” should be “Fig. 3”
- The number in Fig.3 is difficult to read.