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Comment on hess-2022-284

Anonymous Referee #1

Referee comment on "Diagnosing modeling errors in global terrestrial water storage interannual variability" by Hoontaek Lee et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2022-284-RC1, 2022

This study quantified the contribution of each pixel to the global TWS IAV of GRACE observations and two selected predominantly data-driven models, SINDBAD and H2M, as well as its modeling errors. The results show that the global TWS IAV is mainly driven by humid tropical and semi-arid region. The hotspots of modeling errors of the global TWS IAV are mainly located in tropical regions that span across climatic regions. The study provides an improved understanding of the global TWS IAV and its modeling error. Generally, the topic is important, and the study is well written and easy to follow. My comments are as follows.

1. In the high latitudes of the northern hemisphere, glacier changes contribute to TWS, whether the SINDBAD model and the H2M model have a glacier module.

2. It needs to be further pointed out that the model is inconsistent with GRACE in typical irrigation areas, such as the western United States, northern India, etc.

3. Figure 2(a) shows that the two models are in good agreement, and they both have some differences from GRACE. Does the input of precipitation significantly affect the simulation results of the model? If other precipitation products are used as input, will the results be different?

4. The abscissa and ordinate of the scatter plot in Figure 3 have no text description

5. How much different precipitation inputs affect the modeling error of global terrestrial water storage interannual variability? Does the precipitation input or the different model structure affect the simulation error more?