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Comment on hess-2022-398

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Community comment on "A global analysis of water storage variations from remotely sensed soil moisture and daily satellite gravimetry" by Daniel Blank et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-398-CC1>, 2023

I read through this interesting manuscript focused on assessing relationships between soil moisture (SM) and GRACE-based daily TWSA on a global scale. Thanks to the authors for this great contribution to the literature. I have two comments/suggestions that the authors may find relevant while revising their manuscript.

Lines 62-64. Daily TWSA has also been successfully employed to analyze the development and propagation of the water extremes using standardized drought and flood potential index (SDFPI). Please see Xiong et al. 2022a.

More importantly,

Lines 388-389: From these lines, I understood that climate is (as portrayed herein) the major factor for a strong correlation between TWS and SM. [Line 401: not only surface water bodies but also human activities such as groundwater extraction in north India can affect these relationships significantly]. In my understanding, the larger the groundwater extraction for irrigation, the more positive will be the trends in SM, hence the more declining trends in TWS [due to the eventual loss of irrigated GW as runoff, evapotranspiration, and atmospheric moisture content]. Please see Xiong et al., 2022b (third paragraph of section 3.2). How do the authors relate the effect of such human-induced activities to their analysis? Additionally, how this human-related part (e.g., irrigation) is reflected in various SM products as we go deeper.

Overall, I could not find a sufficient description of human activities in the manuscript (though partly touched upon in line 260), which I think should be accommodated, at least as the explicit uncertainty discussion in the analysis and/or future research directions.

References

Xiong et al., 2022a. A Novel Standardized Drought and Flood Potential Index Based on Reconstructed Daily GRACE Data. *Journal of Hydrometeorology*.
<https://doi.org/10.1175/JHM-D-22-0011.1>

Xiong et al. 2022b. Leveraging machine learning methods to quantify 50 years of dwindling groundwater in India. *Science of the Total Environment*.
<https://doi.org/10.1016/j.scitotenv.2022.155474>