

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1  
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## **Comment on hess-2022-257**

Tongchao Nan (Referee)

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Referee comment on "The effects of rain and evapotranspiration statistics on groundwater recharge estimations for semi-arid environments" by Tuvia Turkeltaub and Golan Bel, Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-257-RC1>, 2022

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It is common to synthetically generate essential data series including rain and evaporation based on limited station record in practice. This paper aimed at the impact of how these synthetic series are generated/corrected and investigated several methods such as fixed number of rainy days, monthly averaging, annual averaging etc (five synthesis methods for rain and seven for ETref). These synthetic data are then used in predicting groundwater recharge in one-dimensional Hydrus models with different soil types, and factors influencing groundwater recharges including methods to synthesize data as well as climate and soil type, are analyzed. The results indicated that groundwater recharge statistics indeed depend on data statistics preserved in synthesis methods. It brings attention to the synthesis methods to generate rain and ETref in groundwater applications. I do believe that the conclusions in this paper are very important in a broad community. However, I agree that the authors are onto a good idea and the manuscript is well written, clear and detailed.

My only major concern is that: this study bears a significant limitation of considering only perfectly uniform soil, which greatly constrains the potential values of this study, as is also stated by the authors. If not so, I'd recommend acceptance of this manuscript without hesitation. Hence, it is highly suggested that the authors take factors such as topography and soil structure into account in their ongoing work.

Specific comments:

Lines 28-29: Gurdak et al. 2007 appeared twice. Are these two references the same?