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Comment on hess-2022-291

Anonymous Referee #2

Referee comment on "Estimating karst groundwater recharge from soil moisture observations – a new method tested at the Swabian Alb, southwest Germany" by Romane Berthelin et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2022-291-RC2, 2022

This paper tries to link precipitation- soil moisture- recharge relationship in catchment area scale of karst aquifer environment Good results and discussions are valid and clearly described. The contents of the paper are good and with valuable information to share with related field.

Just some minor points suggest to check before the publishing:

1.There are limited information about the data distribution. For example, 15 sites of soil moisture measurement and discharge hydrograph. It's quite importance to evaluate characteristic from time series of different observation. I like to suggest to authors to add some typical hydrograph or data plots in suitable time windows.

2.Some challenges rises after author use three spatially-combined-averaged soil moisture time series: grassland (G), woodland (W) and all area (C). It's needs to have some assumption and simplify the sites specific and spatially heterogeneity. Specially the karst surface - groundwater system will be spatially continuity such as G-W-G or W-G-W... from upstream to downstream. Such assumption as the paper describe could be only on infiltration processes and assume homogeneous after that.

3. Precipitation- soil moisture- recharge relationship as Fig.2, the paper chose "temporal delays" with a simple temporal buffer. Actually, the time lag or responses lag could be evaluating from cross check between two time-series. Such quantitative linkages also needed to support the following analysis and discussion.

4.I am concerning the precipitation- soil moisture- recharge relationship analysis is event base, and the referred hydraulic parameters also random walks or with discrete distribution. For the calculation in catchment scale or annual flow in close years, such representative hydraulic parameters should be stable. It's better to check the time-variation of the related parameter between different events.