

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1
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Comment on hess-2021-56

Anonymous Referee #1

Referee comment on "Conditional simulation of spatial rainfall fields using random mixing: a study that implements full control over the stochastic process" by Jieru Yan et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-56-RC1>, 2021

General comments:

The manuscript provides a novel approach for spatial simulation of rainfall conditioned on observations from rainfall stations and radar. The methodology is quite complex but plausible. The manuscript is well written and concise. I have only a view minor comments for improvement (see specific comments).

Specific comments:

- The non-exceedance probabilities u_k are called quantiles here. Usually an α -quantile is that z -value with the associated non-exceedance probability α . So, u_k is equal to α here. This unusual definition of a quantile should be made clear before use or the classical definition should be used.
- The introduction suggests that the estimation of precipitation in high spatio-temporal resolution is important. The paper only deals with spatial simulation. There is no reference to the simulation of time series of precipitation. How can this be reached? This should be at least discussed briefly.
- In practice, for mesoscale hydrological studies often only small sample sizes of irregular distributed recording rainfall stations are available (e.g. about 10 stations). How uncertain is the estimation of the cdf with only a few point pairs of data? What is than the value of radar data as additional information to build the cdf?
- Here, random mixing is used as simulation method. I wonder if also another simulation method could have been used after the conditional estimation of the cdf using radar data. May be this could also briefly be discussed.