

Hydrol. Earth Syst. Sci. Discuss., referee comment RC3
<https://doi.org/10.5194/hess-2021-56-RC3>, 2021
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Reply on AC2

Remko Uijlenhoet (Referee)

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-RC3>, 2021

Thanks for your replies to my general comments and suggestions. Based on your reponse, I agree with the proposed changes you intend to implement in the revised manuscript. This reaction is only intended to clarify a few points:

My remark concerning the fact that your analysis is "a pure simulation study" was not meant as a judgment, but as an observation. I definitely agree that simulation studies, where one has full control over the (stochastic) properties of the "true" rainfall field, have their value. As a matter fact, we have also used this approach in the past (e.g. Uijlenhoet and Berne, 2008). My only point was that that should be clearly reflected in the title of the paper, as far as I am concerned.

An alternative route would be to take observed rainfall fields (e.g. operational products from national meteorological services based on merged radar and gauge data), assume them to represent the truth, and subsequently use them as a basis for further simulation exercises (see Rios Gaona et al., 2015, for an application of this approach in a slightly different context). Such fields could also be perturbed stochastically.

Finally, I fully agree with you that the stochastic approach taken by the QPF / radar rainfall nowcasting community (as in Imhoff et al., 2020) also represents a fruitful avenue for the QPE / hindcasting community.

The references below are provided for your interest alone. They should not be included in your reference list.

References

Imhoff, R. O., Brauer, C. C., Overeem, A., Weerts, A. H., & Uijlenhoet, R. (2020). Spatial and temporal evaluation of radar rainfall nowcasting techniques on 1,533 events. *Water Resources Research*, 56, e2019WR026723. <https://doi.org/10.1029/2019WR026723>.

Rios Gaona, M. F., Overeem, A., Leijnse, H., and Uijlenhoet, R.: Measurement and interpolation uncertainties in rainfall maps from cellular communication networks, *Hydrol. Earth Syst. Sci.*, 19, 3571–3584, <https://doi.org/10.5194/hess-19-3571-2015>, 2015.

Uijlenhoet, R. and Berne, A.: Stochastic simulation experiment to assess radar rainfall

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