

Interactive comment on “A space-time hybrid hourly rainfall model for derived flood frequency analysis” by U. Haberlandt et al.

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The two detailed reviews of this paper conclude that the paper represents an interesting contribution to the field of rainfall modeling but that the paper needs a considerable amount of clarifications and technical corrections. The reviewers also raise some methodological points that should be carefully addressed before this paper can be considered for publication in HESS. And as pointed out by the reviewers, the conclusion section should not just contain a summary of the work and the results but the most important conclusions and an outlook.

I would like to add a few "detail comments":

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I suggest that the authors carefully review their mathematical notations and make sure that theoretical quantities (random variables, processes) are clearly distinct from estimated (deterministic) values. (a simple solution is to use a hat $\hat{}$ on estimated quantities). I also recommend avoiding variable names containing several letters (e.g. `wsp` could also be `wsp * t`). A good solution could be to use acronyms in the text (e.g. WSI for wet-spell intensity) but to assign them single letters in the equations.

Case study: Validation of derived flood frequency analysis is of course a difficult task since the observed series are short; an essential step, is the validation of the rainfall model and the runoff model separately. Fig. 5 seems to indicate that the runoff model consistently underestimates peaks but the comparison between observed and simulated flood frequencies with observed rainfall suggests the contrary. Can you comment on this? The indicated Nash values are not really useful to judge the model's ability to reproduce highflows.

To my view, there should also be a more in depth comment on the results presented in Fig. 10: the simulations with random synthetic rainfall seem to fit the observations more closely than the simulations with structured synthetic precipitation, which seems to indicate that the rainfall model combined to the hydrological model lead to a consistent bias in estimated flood frequencies.

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