

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1
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Comment on hess-2021-49

Anonymous Referee #1

Referee comment on "Identifying Sensitivities in Flood Frequency Analyses using a Stochastic Hydrologic Modeling System" by Andrew J. Newman et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-49-RC1>, 2021

The paper is well structured while the content is very dense and properly concise. The paper gives an important contribute to the analysis of factors affecting the FF curve by performing a deep analysis of the effects produced by models structure, model parameters, interaction between model parameters and model structure, initial conditions (in terms of water content) and precipitation events. In my opinion the paper can be accepted subject to minor revision.

I suggest the authors prepare a flux diagram describing their workflow, i.e. all the steps of their procedure. Indeed, there is a lot of attention on how the available data are used and this, in the end, slightly obscures the logic and the sequence of the steps. In this (or these) diagram(s) the authors should highlight the deep meaning of each step independently of the way the available data are used for their quantification.

It is not completely clear to me how the rainfall events are generated starting from the precipitation frequency curve. I understand that simulations are performed with a time step of one day and thus precipitations are generated with this time step. However, in the case of Island Park, a two-day precipitation event is generated from the frequency curve and I do not understand if the total of precipitation in two days is generated or if the event is scanned at daily level.

Overall, I prefer continuous simulations than event simulations: in fact, in this way the "natural" combination between rainfall periods and flood periods is obtained without any artificial combination between initial conditions and rainfall events. Instead of using the regional analysis, why don't the authors have set up a rainfall model (Neyman-Scott or Poisson model), performed long simulations and extracted annual maxima from them?

Incidentally, Hashimi -> Hashemi