

## ***Interactive comment on “Event generation for probabilistic flood risk modelling: multi-site peak flow dependence model vs weather generator based approach” by Benjamin Winter et al.***

### **Anonymous Referee #1**

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Winter et al. presented in their paper (“Event generation for probabilistic flood risk modelling: multi-site peak flow dependence model vs weather generator based approach”) two approaches to simulate distributed flood risk throughout rural catchments. The manuscript is well written and structured. The methods are sound and the models used are well established. The results are clearly presented and the conclusions are supported by the results and discussion. The novelty of the paper is not with the development of new methods, but the use of available methods (that are common in hydrological sciences) in the context of risk assessments. I believe that the application presented here will be of interest to the natural hazard community and fall within the scope of NHESS. Below please find some suggestions for the authors to consider. I

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recommend minor revisions.

#### Specific comments

1. Introduction – You do compare the two distributed approaches to the “traditional” approach, but this is not clear from the introduction. I suggest adding a sentence mentioning this.
2. Discussion – Many other models, besides the HT-model and the WeGen model, can be used to estimate distributed risk. For example, one can use a different WG model (say the AWE-GEN model) and a different hydrological model (say the HBV model) with a different outcome – e.g. that the WG-hydrological model approach will systematically underestimate the risk computed by the HT-model. I suggest adding another paragraph in the discussion section, discussing how general are the results of this study.
3. The WeGen model simulates temperature, but do you use it as input into the hydrological model? It is not clear from the text. If not, I would remove all text mentioning the temperature simulation to avoid confusion.
4. Some justification is needed for the choice of the HQsim model. Is it able to capture well extreme runoff events? Please discuss the advantages and limitations of using a conceptual semi-distributed rainfall-runoff model to simulate floods.
5. [page 7, line 25] Terminology: an ensemble of 100 realizations, each consists of 42 members (years). Also later in the text, replace “repetitions” with “realizations”.
6. Figures 3 and 7. Please use a larger font size for the axes labels.
7. [13, 27-31]. I suggest adding in Figure 5 the known losses from the records (e.g. the August 2005 event) and discussing the models’ performance in comparison to the “known” risk. It will give another dimension (from an “expert” knowledge) of the abilities of the different models in assessing the risk.

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