

Interactive comment on “Estimating extreme river discharges in Europe through a Bayesian Network” by Dominik Paprotny and Oswaldo Morales Nápoles

Anonymous Referee #2

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The manuscript used a new Bayesian network to estimate extreme river discharges, which incorporate climate and large-scale spatial environmental datasets, and the joint distribution of the environmental variables are quantitatively considered. In general, the manuscript is well written, the methodology is well presented and the results are consistent. I am supportive of the paper, while having the following questions and comments.

1. page 9, line 5. It is not clear to me which empirical marginal distribution is used for the variables considered in Fig3. In particular, I am curious on which marginal distribution is used for Max discharge data. Whether it is an extreme value distribution (or skewed distribution) or some other distribution? Please explain the reason if just a

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Normal distribution is used, because the extreme data may not fit well.

2. Page 5, line 3. (VII). From the Bayesian network, a conditional/marginal distribution of the max discharge data can be obtained. But how a particular value of the annual maxima is obtained? Is it the median?

3. Section 2.5 and Fig 3. Seven variables are considered as parents of max discharge in the manuscript, which means that the max discharge is “predicted” using 7 variables. Since the network is not created automatically, manually developing a model with seven predictors could cause the problem of overfitting (a good fit but with poor predictability). The model validation (section 3.1) showed the fit is good, but the “risk” of overfitting is not discussed. Usually a cross-validation need to be considered, but I understand that it is hard to conduct such analysis for the max discharge with limited data. I think it may worth to put some discussion of overfitting in the manuscript.

4. Some references are missing, such as Hanea et al. 2006 (page 9, line 28) and Mutua 1994 (page 11 line 26). Please check carefully for the rests.

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