

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1  
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## **Comment on hess-2021-229**

Anonymous Referee #1

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Referee comment on "Applying non-parametric Bayesian networks to estimate maximum daily river discharge: potential and challenges" by Elisa Ragno et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-229-RC1>, 2021

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In the study, the authors mainly investigated the performance of the Non-Parametric Bayesian Network for the estimation of monthly maximum river discharge, and also discussed its challenges, with a case study in the 240 catchments in USA. Overall, the paper was rewritten well, and many details were clearly explained. However, there two main issues that should be clarified to further improve the quality of the paper before its submission.

First, the authors briefly explained the motivation of this study as: "very little attention has so far been given to explicitly representing the interdependence between inflow and outflow via probability functions". However, it is not clear enough, as there have been many methods used for describing the relationship among variables through probability functions. The key issue should be further explained very clearly to clarify the potential novelty of this study in Introduction.

Second, there lacks "comparison discussion" between the NPBN-based results here and the previous studies in the study area. There have been so many studies in these catchments and others in USA. Without comparison, the advantages and challenges of the NPBN model cannot be easily understood. Thus I suggest adding some comparison contents to prove the advantages of the NPBN.