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Comment on hess-2022-233

Anonymous Referee #2

Referee comment on "A principal-component-based strategy for regionalisation of precipitation intensity–duration–frequency (IDF) statistics" by Kajsa Maria Parding et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-233-RC2>, 2022

In the study, the authors employed the principal component analysis and the Bayesian linear regression method to investigate the precipitation Intensity-duration-frequency (IDF) curves and their spatial distribution in Norway, and also explored the prediction by considering both geographical conditions and local climate characteristics. The description of extreme rainfall events, especially at short timescales, is important for the control and management of natural disasters, but it is also a big challenge. Thus, the new approach proposed in this paper for prediction of precipitation IDFs is useful and could be a good reference for the related studies. Overall, the paper is well written and easily readable. However, the following issues are suggested to be considered for further improving the quality of the paper before its publication.

The first issue is about the stability of the relationship between the shapes of IDFs and those predictors selected. For the geographic predictors, their values are constants, however, the values of those climatic predictors closely depend on the data periods selected. Their values only based on short data period in this study would have big bias from the true values, which would significantly influence the stability of the relationship between the shapes of IDFs and climatic predictors. Especially, the authors discussed in Section 4 that the approach can be used for downscaling of climate change projections, if we cannot ensure the stable relationship between the shapes of IDFs and these predictors, how to do downscaling and ensure the reliability of the results? At least the issue should have a deep discussion including the influence or the uncertainty analysis in Figure 4 and 5.

The second issue is about the presentation of the results in Figure S8. Considering that the spatial pattern from Figure S8 is an important information for understanding the spatial distribution of IDFs, it is suggested that the Figure and its related information can be added in the main document rather than in the Supplementary material.

The third is about the applicability of the new approach proposed. Actually, the authors very briefly mentioned it in the last paragraph in the paper, however, it is not enough. As the study area of Norway has special climatic conditions, how about the applicability of the new approach when applying to other regions with totally different climatic conditions? It is suggested more contents be added to discuss the issue.

Besides, how to determine the predictor of "distance to ocean". The key issue can be explained more clearly.