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Comment on hess-2022-118

Anonymous Referee #1

Referee comment on "Regionalisation of rainfall depth-duration-frequency curves with different data types in Germany" by Bora Shehu et al., Hydrol. Earth Syst. Sci. Discuss.,
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Review: Regionalisation of Rainfall Depth-Duration-Frequency curves in Germany, by Shehu et al.

General comments

This study examines the use of different data types and methods for estimating reliable Rainfall Depth-Duration-Frequency curves (DDF) for Germany. The main aims are 1) to investigate the best local estimation method, 2) to evaluate the best regionalisation method and 3) to assess the impact of using different data sets on the regionalisation. The analysis is based on a very comprehensive dataset, including 5000 stations with more than 40 years of daily observations and more than 1200 stations with high resolution (1min) recordings. The results show that the best local approach for Germany is based on Koutsoyiannis et al. (1998) framework. The best transfer method to ungauged sites is based on the kriging regionalisation with external drift, where the drift is estimated from the short sub-hourly time series. The integration of stations with daily observations improved the estimation of DDF values only for low return periods ($T < 10$ years).

Overall, the study presents an interesting topic which is within the scope of HESS. It is clearly written. The analysis is based on a unique and very comprehensive regional dataset of high-resolution rainfall observations. Still, the manuscript can benefit from a more precise formulation of the scientific novelty. It reads (in its current form) more like a technical report or a pure case study rather than a scientific paper. The Introduction does

not clearly present what the current research gaps are. It indicates numerous studies performed in the past, but the novel contribution of this manuscript is not clearly formulated. Importantly, I missed a discussion section that links the results with previous findings and shows how this study goes beyond the previous research and what the main scientific novelty is. The study presents a large number of evaluations and results and uses a very dense regional dataset. Some more effort to link the results with regional characteristics and hydrologic and climate processes can add more significance to the results and add a new dimension to the demonstration of the generality of findings.