

Interactive comment on “Modeling the spatial dependence of floods using the Fisher copula” by Manuela I. Brunner et al.

Anonymous Referee #2

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The present work analyzes the occurrence of flooding events at a regional scale. In this context, it is crucial to account for the dependence among flowrates at diverse locations. The modelling of the dependence of flooding events is here tackled via the recently proposed Fisher copula. Furthermore, the Authors provide a framework to spatially interpolate flowrate (during the realization of flooding events) at ungauged stations, leveraging on the Fisher copula embedding the dependence among gauged stations. As physical distance for the interpolation of the flowrate, the Authors find that the river length is the most appropriated one. The Authors compare the proposed approach with several others type of Copula and Max-Stable processes, finding that for the Thur catchment in Switzerland the Fisher copula give the best results. I think that the paper is worth for publication after some minor revisions. Comment 1 The

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Event Definition procedure could be hard to follow, perhaps a graphical depiction of the procedure (based only on two records and up to line 12 of pp. 5) could help the reader to follow it properly. Comment 2 Figure 3: I would not add the interpolation line connecting the observations, I think it would make more convincing the smoothing spline and the exponential fitting. Comment 3 Figure 6: it is really hard to read the figure. I suggest to split in (a) and (b) panels, where poorly performing models and satisfactory models results are depicted respectively. Comment 4 At first, inspection of Fig. 3 and Fig. 6 suggest a very erratic structure of the dependence (via correlation coefficient and/or F-madogram) in the data as a function of the river distance. This makes suspicious the use of such a distance as a good explanatory variable and the reliability of the current work. Then I have realized that dependence metrics in both Figs 4 and 6 are evaluated just among pairs of gauged stations (e.g., the erratic behaviour of the correlation between two stations with a distance of approximately 80Km is due to the fact that the two pairs of stations could be placed in the upper or lower portion of the catchment, making a marked impact on the correlation coefficient. The same for the F-madogram) : this clearly reveals the need for a multivariate assessment of the dependence to me. I think a sentence pointing out this aspect in the text would help the readers.

Please also note the supplement to this comment:

<https://www.hydrol-earth-syst-sci-discuss.net/hess-2018-159/hess-2018-159-RC2-supplement.pdf>

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2018-159>, 2018.

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