

Dear Dr. Hrachowitz,

Thank you very much for your re-assessment. I appreciate the further comments by Reviewer #1 and address them in the revised version of the manuscript.

Best regards,

Manuela Brunner

Reviewer 1

I would like to thank the Author for addressing the comments provided very carefully. The manuscript has improved substantially.

Reply: *I would like to thank the reviewer for their careful reassessment.*

At the same time, the issue of identifying multivariate extremes is still highly linked to identifying univariate extremes and then looking at them together. Questions such as When does an extreme in one location become a multivariate extreme? How many locations should be flooded? Is the regional extent of the univariate flood an indicator of whether an extreme is multivariate or not? are missing. This is the trickiest aspect of multivariate extremes and should be addressed. Moreover, starting from the premise that environmental variables are connected because the system is connected, when is a "simpler" univariate approach not anymore sufficient?

Reply: *Thank you very much for pointing out the need to further elaborate on the definition of regional extremes and their relationship to spatial extent. I clarified that 'Here, we talk about regional extremes as soon as a local perspective is no longer sufficient, i.e. when floods have a larger spatial extent and more than one catchment is affected, which requires a multivariate perspective.'*

Finally, another point missing and worth addressing is whether the use of a descriptor already implies the choice of a modeling approach. For example, using dependence metrics, e.g., Kendall's tau, already implies the use of models based on bivariate copulas. In other words, it would be useful to explicitly address the issue of choosing a descriptor and a model and whether the choice of one already implies the choice of the other.

Reply: *Thank you for raising this point. No, the choice of descriptor does not necessarily imply the choice of a modeling approach. One could use Kendall's tau to describe pairwise dependencies and then use a stochastic model to simulate streamflow/extremes at a pair of stations.*

Lines 124-125: It seems something is missing in this sentence.

Reply: *Thank you for highlighting the need for rephrasing. The revised sentence reads: 'For example, the synchrony scale measures over which distance around a catchment, multiple rivers experience flooding at the same time.'*