

Review of « Spatially dependent flood probabilities to support the design of civil infrastructure systems »

GENERAL COMMENTS :

The authors have significantly modified and improved the manuscript, taking into account my comments. In particular the model is now much more clearly presented for HESS readers. My only significant comment regards the Authors' response to my previous Minor comment #14. Indeed using an inverted max-stable process rather than a Gaussian process -the two of them are AI- complicates much the theory, model estimation and simulation. I know that max-stable processes are theoretically founded for AD models (see Schlather 2002) but what about inverted max-stable processes for AI models? I might be wrong but I don't think there is any theory saying that inverted max-stable process are well-founded for AI models. Given that this article will be mainly read by non-statisticians, I do wonder what is gained by using the inverted max-stable process rather than a Gaussian process, which is much easier to handle. I understand that model comparison is not the goal of the paper but could the authors please better justify their choice for the inverted max-stable model? Otherwise it sound like using a sledgehammer to crack a nut.

DETAILS :

(The lines refer to the marked version)

- L 69-69: "This is likely to be because" → this is likely because
- L 102: a more applied work on max-stable process for extreme rainfall is:
Blanchet, J. & Creutin, J.-D. (2017), 'Co-Occurrence of Extreme Daily Rainfall in the French Mediterranean Region', *Water Resources Research* **53**(11), 9330—9349.
- L 228: "fit to observed rainfall" → above some large threshold, I guess
- L 130: "on average only once on average"
- Figure 4: actually, don't you only fit the marginal model (GPD) above the threshold?
- L 313-314 and 316-317: isn't this a repetition?
- L 376: "which the dependence model" → syntax issue
- L 431-437: "the covariance element ... 9 hr" → isn't it possible to make one sentence from these two (for two durations D1 and D2 in general)?
- L 717: "all of events" → all the events