

## ***Interactive comment on “An application of the Bivariate Generalized Pareto Distribution for the probabilities of low flow extremes estimation” by W. Jakubowski***

### **Anonymous Referee #1**

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The paper applies the Bivariate Generalized Pareto Distribution to represent the joint probability of low flow deficits and durations probabilities.

The topic is of great importance for the statistical hydrology area, and it is certainly of interest to the HESS audience. However, (in my view) in order to warrant publication in HESS, the paper should either offer new theoretical insight or represent an important application of new methodologies. I believe that this manuscript as it stands should be rejected.

The paper presents several weak points that should be resolved: 1. The paper does not properly present/discuss the results and the consequent conclusions. The authors

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need to improve the analyses of the results and not only make references to Tables and Figures. In particular, the Section entitled “Comparison to Zelenhasic and Salvai (1987) model (ZS model)” has a lot room for improvement. Also, the authors should further explain the results reported in the Figures corresponding to this section; 2. While I can understand the ideas that the authors are trying to convey, the writing style needs to be improved in order to make clear the message to the reader. Also, there are a few typos and misuse of words (effect &#61664; affect) that can be picked up in a thorough review. The English is very poor; 3. Point #3 in conclusion needs further discussion in the results section; 4. The paper is not up-to-date with the advances in multivariate frequency analysis, as for example the use of copulas; 5. Frequency analysis studies report problems in the identification of the GEV/GP shape parameter when using Maximum Likelihood. The reason is that, unlike other methods, Maximum Likelihood does not impose any restriction on the shape parameter. However, it can be easily changed to do so, by for example using a prior on the shape parameter. The problem experienced by the author (Point #1 of Conclusions Section) might be due to the shape parameter estimation. 6. The authors should provide specific literature related to the subject in order to establish the context in which their work fits in. A good review of literature is needed in order to establish the state-of-the-art.

I regret to inform the author that my recommendation is rejection. In order to pursue re-submission the authors are left with the challenge to make their case more compelling, specially in terms of application, and, as well as, address all issues raised before.

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