Modelling rainfall with a Bartlett-Lewis process: pyBL (v1.0.0), a Python software package and an application with short records

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Author's Response

We thank the Editor and the Reviewers for carefully reviewing our work and making constructive comments. We appreciate all the time and efforts they put in their thorough review. All the reviewer comments were considered in the revised manuscript. Detailed answers to each comment are given below.

1. Referee #1 (Report #2):

Accepted as it is.

R/ We would like to thank the Reviewer #1 for agreeing with the changes made in the revised manuscript and for accepting it.

2. Referee #2 (Report #1):

I still disagree with giving less weight to more uncertain statistics, as they significantly influence the model's ability to reproduce extremes. However, your method of determining the weight factor is grounded in strong mathematical reasoning, so I have no objections to its implementation. That said, I believe practical hydrological relevance (e.g., the tool's primary use for simulating extreme events such as floods and droughts) should sometimes take precedence over theoretical perfection. I recommend that at least metioning about this matter. Otherwise, the article is in great shape!

R/ We would like to thank the Reviewer # 2 for the comment regarding the weight estimation for selected statistical properties. We understand your concern about accurately reproducing statistics with higher uncertainty and its impact on reproducing extreme statistics. However, we would like to argue that the current 'inverse variance weighting' method is not just a matter of mathematically justifiable. It actually reflects the reliability of a given statistical estimator. That means, if an estimator (e.g. of the skewness) has a greater variance, it is a less reliable estimate of the true population skewness. Therefore, we should not be seeking to reproduce it at all costs.

We however agree that it would be interesting to provide the option of different weights: if there is a particular hydrological application at stake, then it can make sense to put more weight on some rather than other statistics. Although the current pyBL package allows users to adjust weights, it is not straightforward to make the changes. In response to Reviewer's suggestion, we will incorporate a user-selectable weighting scheme in future versions of the package. This will provide a more friendly interface for users to explore alternative weighting strategies, such as

equal weighting, or to tailor the weighting to specific needs. The inverse variance weighting will remain the default option, given its statistical robustness.

In the revised manuscript, the description of weight calculation in Section 2.2 has been extended to clarify this, and the option allowing to assign different weights in the future version of the package is mentioned in Section 5.