Hydrology and
Earth System
Sciences
Discussions

Interactive comment on "Precipitation extremes on multiple time scales — Bartlett–Lewis Rectangular Pulse Model and Intensity–Duration–Frequency curves" *by* Christoph Ritschel et al.

Anonymous Referee #1

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This paper investigates the ability of the original Bartlett-Lewis model for estimating extreme rainfall at various levels of aggregation. Unfortunately, the paper is not very novel. It is already known for a long period that the Bartlett-Lewis (BL) models have problems in reproducing extremes, especially at shorter aggregation levels. It is not clear why the authors chose for the Original Bartlett-Lewis (OBL) model, while the Modified Bartlett-Lewis (MBL) model or one of the later versions (e.g. Onof and Wheather, 1994) that were further optimized for addressing the problem of the undergeneration of extremes.

An important part of the paper is dealing with the fact that using a short time series for calibration may have an important impact on the statistics described by the observed extremes: the highest extreme may have a much larger return period than the one estimated from the time series. This, of course, is not surprizing, and the shorter the time series used, the higher the potential becomes of facing with extremes that have true return periods much larger than the length of the time series. Yet, this example may be of interest for the scientific community, especially for young researchers starting in the domain of stochastic hydrology. Therefore, I believe this part of the paper may be of interest, though not very novel. Yet, I would like to give some suggestions that may improve this section: (1) using the model with 12 extremes, calculate the return period of the highest extreme that was omitted (i.e. the one in year 2007) to frame how extreme this event in 2007 was? (2) Why not redo the same exercise with the Peak-Over-Threshold method, where the threshold is put quite low to ensure a larger number of extremes? This may reduce the uncertainty on the IDF curves as more data are used to fit the parametric model?

Some minor comments:

Line 1: time series (no dash)

Line 2: data are (the noun "data" is plural)

Line 11-12: here it is not clear what is meant with a singular event. Context is not sufficiently provided.

Lines 33-34: (Koutsoyiannis et al., 1998; Soltyk et al., 2014): braces are put wrongly

Line 73: mention what version of the BL models is used (i.e. the Original BL model)

Line 147: remove the footnote after the equation as it reads as if (1-p) is put to the power "1". The text in the footnote can easily be introduced in the sentence.

Line 181: sentence ends with two dots.

Line 208: put a dot after "length".

Line 227: February is spelled wrongly.

Lines 227-228: please introduce a figure to illustrate this.

Line 232: True, but this is a typical problem occurring for too short time series used for extreme value analysis: fitting a distribution to 13 points is questionable!

Line 243: (Coles, 2001): braces are put wrongly

Line 243: 11 out of 12 months (plural)

Line 289: extent (not extend)

Line 299: "which may not be reproduced by the BLRPM": this may be reproducible! Only, its occurrence may be very low causing that this event was never modelled during the short time series generated! What is the return period of this "singular" event based on the model built from all extremes excluding this event?

Line 330: define "relative difference"

Appendix A: please provide information to the reader of what should be learned from the figures presented in the appendix. Nor the appendix or the text sufficiently elaborates on this.

Figure 5: legend is blurry.

Figure 6: in caption: 1000 simulations: no capital S

Figure 7: text in figure + legend are blurry

Figure 8: legend is blurry

Reference

Onof, C. and Wheater, H. S.: Improvements to the modeling of British rainfall using a modified random parameter Bartlett-Lewis rectangular pulse model, J. Hydrol., 157,

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177–195, 1994.