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Hydrology and Earth System Sciences Discussions

Interactive comment on "Estimation of high return period flood quantiles using additional non-systematic information with upper bounded statistical models" *by* B. A. Botero and F. Francés

Anonymous Referee #2

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GENERAL COMMENTS

The paper presents a probable maximum flood approach, implemented including also the use of non-systematic information, to estimate very extreme floods. The topic is very interesting, although I suggest to the authors to extend their discussion about the reliability and uncertainty of the final estimates, clarifying and generalizing the procedures used in the paper.

SPECIFIC COMMENTS

Page 5419, line 22; The threshold level of perception used to classify non-systematic

floods is intended as a function of the return period H; however, the notion of a threshold return period is not present in figure 1 where the censored data are sketched. Although a pair of references are provided, authors could make clearer the concept adapting figure 1 to account for a variable threshold, and describing (at page 5419) the effect of such variability on data classification and parameter estimation.

Page 5421, line 24; The first method reported for the estimation of the upper bound is the evaluation of an a priori value G through 'traditional means'. I think that any estimated value should be associated with a measure of its uncertainty or, at least, a degree of reliability. Is this possible to calculate such uncertainty for the estimated G? If this can be done, I would explicitly report here the method used.

Page 5424, line 20; Please clarify how the averaged year, that define the beginning of the historical period, leads to an unbiased estimation of the number of known floods.

Pager 5425, line 4; Authors state that the lower bound for EV4 and LN4 distributions has been fixed to zero. I suppose that this assumption has been evaluated and tested, but I would report an explicit reference to this issue.

Page 5425, line23; The proposed distributions show very different behaviors for the return periods of interest, as it is expected for both bounded and unbounded distribution. In the upper tail no data are available to support the choice of one specific distribution, so the choice is done analyzing the goodness of fit to the available data. This introduces an additional source of uncertainty due to the model selection, and make risky to base the prediction on only the selected model (e.g. Burnham and Anderson, 2002). I would evaluate also a 'model-averaging' approach in which the outcomes of more than one model are combined together (for example with a weighted average). This point can be further extended introducing other probability distributions in addition to the EV4, LN4 and TDF.

Page 5426, lines 9-16; The paragraph deals with the selection of the methods which lead to a reliable estimate of g. Although the choice made by the authors seems

appropriate for this case study, it would be better to define a more general and objective procedure to discard the 'out-of-range' estimators of g.

Page 5427, line 8; Authors should justify the values assumed to model G uncertainty.

TECHNICAL COMMENTS

Page 5423, line 11; missing 's' in 'expresion'

REFERENCES

Burnham KP and Anderson DR. Model selection and Multi-Model Inference. Springer, II edition, 2002.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 5413, 2010.