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Hydrology and Earth System Sciences Discussions

Interactive comment on "Estimating the flood frequency distribution at seasonal and annual time scale" *by* E. Baratti et al.

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The paper describes a new methodology to consistently and jointly estimate flood frequency distributions at seasonal and annual time scales. I believe that the paper is well written, to the point and provides a novel and suitable contribution to HESS.

I have only suggestions for minor revisions. Although minor, I do think that the suggested revision would make the paper stronger. My suggestions are the following:

1. Most importantly, a discussion section is lacking. Since the paper is about a new methodology, I think that a discussion of the method is important in order to outline the applicability of the methodology to readers. In particular, the im-

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plications of application of the new method for the end users of flood frequency analyses are important to recognize. Furthermore, the implications of choices in the methodology (choice of the season separation, choice of the weights) on the results are important to discuss.

2. The authors describe the sensitivity of the choice of the weights in the optimization process. However, the choice of the division point between one season and the next, as well as the amount of seasons may in many cases be rather subjective. The authors suggest this on page 7957, but do not demonstrate what this means. This subjectivity is not a problem, as long as the effect of this subjective choice is demonstrated. I recommend that the authors demonstrate the effect of this sensitivity on the results (i.e. what would it mean for the results if we would select a different subdivion of seasons, either by selecting different dates or different season amounts? What are the implications of choosing seasons that are slightly less statistically independent?). This is important a) because in some applications a user may select season divisions that are important for his/her decision making process rather than seasons that are mathematically statistically independent; and b) because the division of seasons may not always be so clear as in the Blue Nile case, where a clearly defined wet and dry season exists.

Small in-line comments:

p. 7950. l. 11. Between ‘occurrence’ and ‘We’, start a new paragraph

p. 7950. l. 14. “assumption of mutual independence”. Explain what this assumption means and why it is required.

p. 7950. l. 17. “, which consists in the” ; “, consisting of the”

p. 7950. l. 24. “since it combines”

p. 7951 l. 19-22. Difficult reading. The sentence is somewhat unclear. Could you try to rephrase this one? L. 22. Should “analysis of peak flows” be “analysis of yearly peak flows”??

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p. 7953, l. 5. “Since eq 2 depends only on seasonal parameters

p. 7953. l. 9-12. “whose frequency distribution is used twice”, this is unclear to me. How and why is it used twice?

p. 7953, l. 22. “that reaches Egypt, originates from the Blue Nile.”

p. 7955 - 7956. A lot of effort is put into the derivation of the seasons. Should this part not be part of the methodology itself?

p. 7957, l. 1-7. On the correlation between seasons. There’s a very suggestive statement about a higher chance of correlation when more seasons are defined. So demonstrate this (e.g. by choosing different season subdivisions and repeating the experiment) and discuss the implications!! (see my comment above).

p. 7959 before Conclusions-section. Introduce a discussion, see my previous comment.

p. 7959, l. 7. “in the entire year is higher than or equal to the probability. . ..”

Figure 2. Please plot the maxima and the hydrograph on the same y-axis scale. It is confusing.

Figure 4. Small error in the caption. 1.15

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 7947, 2012.