

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
<https://doi.org/10.5194/hess-2021-570-RC2>, 2022
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Comment on hess-2021-570

Anonymous Referee #2

Referee comment on "Technical Note: Flood frequency study using partial duration series coupled with entropy principle" by Sonali Swetapadma and Chandra Shekhar Prasad Ojha, Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-570-RC2>, 2022

General comments:

The technical note "Flood frequency study using partial duration series coupled with entropy principle" is interesting. The subject is practical in flood frequency analysis. However, I could not determine the tangible advantage of the applied method. From my point of view, this paper is more like a research paper than a technical note. In general, it follows the scopes of the HESS journal. The advantage and novelty of the paper have to be highlighted in the manuscript. Therefore, the manuscript has more room for improvement.

Specific comments:

L7 & L14: In the text, you mentioned "quality discharge" several times; what does this term mean?

L17-19: In the abstract, more focus on results is needed. Why "POME" is an effective tool?

In the manuscript and especially in the introduction, you used 34 references that are old (before 2000). It is better to employ recent research. However, it is not a critical point.

L31-33: Could you please elaborate more? How is it possible to thoroughly evaluate the flood generating processes?!

L37: What does "better performance of PDS" mean?

L39: Please explain "Poisson arrival of peaks" before mentioning it in the text.

L 41: What do you mean by "Poisson process"? Readers demand to have clear fundamental literature in the introduction.

Please reflect and indicate your method advantage in the introduction. By having a wide variety of " λ ", what is entropy-based models' preference?

You mentioned several times "probability dist." And "fitting dist", what are your purposes to point them in the introduction part? I understand what you did, but is it not vivid in your manuscript.

L66-72: This paragraph must be rewritten to address the proposed method's necessity and novelty. Now, I did not get any points.

L75: In this sentence, what do you mean by "dual"?

Table 1: What is " Γ ", I did not find its definition in the text.

L100: What is the benefit of the "negative binomial dist." in your context?

L119: Why, in this paper, "e" has to be in a logarithm base?

L129-130: "therefore, while ... (Lee et al., 2011). I do not understand this sentence.

L131-136: irrelevant to previous sentences; it has to be somewhere else.

L163-165: Rewrite the sentences. It is not understandable.

L169-171: Could you please graphically explain this condition?, then "intermediate" discharge can be intelligible in L173.

L171: Do you mean mathematically and logically using OR in Eq. 13? Because it has to be in this form.

Table 3: ADC has to be mentioned after AD, not in the end.

L200-201: Does not have vivid meaning.

L206: What is conventional statistics in this research? And what do you want to point by comparing these models?

Page 9: What does this method work if $\lambda=2$? Two independent events per year.

Is there any way to calculate the threshold by assuming two events per year?

Figure 1: It is good instruction; however, you need to elaborate more on the second box "Extract PDS at ...", explain the third box in the text, before this figure, and answer the question of "what if for non-linear approach" for the fourth box.

L 225-226: remove it. It is not relevant. "Flood management ..."

L228: What does excellence mean in FFA? Does it mean long-term?

Table 4: The mean and std of maximum daily flow are the same. I do not have your data. Do you think, is it correct?!

L238: What are the applied thresholds? Please write them in this part.

Figure 2: in a, did you omit the values upper the critical dash line? What is the interpretation of the negative values in Kendal tau (y-axis)

I am curious to know the reason for the higher correlation in 9 step time lag in b.

L244: How many peaks did you select in the designated threshold?

Figure3: is an excellent figure, but a question rase up, why did you consider values below $\lambda=1$? What is the benefit of showing, for example, eight peaks per year in FFA? Because they are not "flood" anymore.

L278-279: How do you recognize the linear behavior in the figure? This is an entirely ocular and non-mathematical diagnosis. Where does the plot start to shift?! How do you consider linearity if the threshold in Figure 4.b? By changing the y-axis, it is not linear anymore!

L283: explain more.

Page 14: What is the range of dispersion ind.? What does 1 in your study mean?

What is/are the reasons for having high DI at low dispersion? and reflect it in the manuscript.

L319: "The average number of peaks per ... 2.5 to 3.2", It is a wide range for long-term high-resolution time series. What do you think about that? Could you suggest $\lambda=3$ as an average value for your case study area? Or, it is still sensitive to this range.

Table 5: It is not needed to write the λ column here. It is not in the continuation of the entropy section.

L320-324: Do not need to mention here.

L324: Rewrite the sentence "A similar analysis ..."

L339-340: Did you have any other expectation for having a higher design flood for the considerable return period in GEV?!

Figure 9: What is the reason for the abrupt jump around 950? I know, what is LL & UL but please mention their abbr.

L359: Why and how do you select 730?

Page 17: Still, I do not understand the advantages of your method!. Is it faster? Is it hydrologically more reasonable? Is it prevent to do some additional steps?

Conclusion question: Is it possible to have no peaks per year? I mean, the average peak per year is 3.2, and theoretically, it is possible to have several independent peaks in a year and no peak in another year. Did you have such a drought year or period?

Technical corrections:

L36: You already mentioned " λ " in the text.

L46: Please define EDF abbr.

L93-94: Please write this part in equation format

Table 1: Please cross-check the L moment expressions. I believe it has a mistake in the typing.

L98: GPA is wrong. It is GP all over the manuscript.

L 109: Can be merged to the above equation.

Page 5: "y" and others are not the same format as other parts of the paper. i.e., "y" à y

L 114: by (Shannon, 1948) is the wrong citation form.

L 141: Eq. (4), while in line 124, it is written Eqn. So it has to be the same in all parts of the text.

L 149: the "Generalized extreme value" should be "Generalized Extreme Value" or "generalized extreme value".

L154: Why eq. 11 is bold?

L177: The repetition of (PDS) is not needed anymore.

L185: When you mention the "Schwarz bayesian criterion" instead of the "Bayesian information criterion" term, you should write SBC, SIC, or SBIC, not BIC.

L203: "The Dispersion ind." Should be "The dispersion ind.".

L228: Extra parenthesis

L239: in Sect. 2.4 ---à in Sect. 2.4.

Figure 3: Please fix the place of the arrow for the domain3

Figure 4: It is better to have the same x-axis (200-400). Also, y-ais in b is not appropriate.

L284-285: by Cunnane is mentioned several times.

L286: DI, did you mention this abbr in the text before?

Please take care of using abbr in the text. Sometimes, it seems that they are written too much!!

Figure6: Different y-axis makes it difficult to compare total entropies. You can at least use the same minor grid with two decimals.

Using colors may be better to show the result. Sometimes it is not easy to recognize the exact points.

L325: KS and AD statistics

Figure 7&8: Surely use colors. Legends are not readable for me.

L373: Different abbr. at OH. Sometimes it is OBH.