

## ***Interactive comment on “Theoretical investigation of process controls upon flood frequency: role of thresholds” by I. Struthers and M. Sivapalan***

**Anonymous Referee #2**

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GENERAL COMMENTS: As clearly stated in the title, this paper, based on a theoretical approach, try to link the flood frequency response of a model to the triggering of the various processes simulated. Once this objective is stated, and it is clearly defined in the introduction, the use of a simplified hydrological model as well as a, certainly imperfect, stochastic rainfall generator, is, from my standpoint, absolutely justified, even necessary. Indeed, it enables an analysis that would otherwise, if using a more complex model, be very difficult to achieve or even impossible to realize. Globally I think that this paper is very well structured and very interesting. The development and results are well described and explained in steps where processes are added and their impact on frequency floods explained. The main conclusion, which is, in my opinion,

that flood frequency, since inherently non homogeneous because it involves the triggering of different processes, agrees with physical intuition and is, nevertheless, nicely supported by this “theoretical” example. I thus think that this paper addresses a relevant scientific issue within the scope of HESS and that, even from a strict theoretical point of view, it presents stimulating ideas. Although I think that the figures are adequate, I would suggest to reduce the number of curves presented (e.g. for figure 4b), keeping only those absolutely essential for the demonstration.

I therefore recommend that this paper be accepted for publication considering the following minor corrections.

SPECIFIC COMMENTS: - P. 3290, 13th line: add a space between “A” and “QT\* ”;

- P. 3291, 12th line: I would suggest to use the expression “inter-event expected potential evaporation volume” instead of “per-event expected potential evaporation volume”;

- P. 3298, paragraph from 12th to 27th lines: I didn’t understand what the authors exactly mean in this paragraph when they discuss of the equivalence between using simple “wet-season-dry season” seasonality and non-seasonal case using average parameter values modified by 50 % of the seasonal amplitude. Are they talking of the hydrological parameters?

- I would suggest, since it would help the reader when comparing figure 3a and 3b, to use the same y-scale.

- Figure 7a: I think the empty triangle symbols correspond to  $\beta = 1$ .

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 3, 3279, 2006.

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