

***Interactive comment on* “Threshold effects in catchment storm response and the occurrence and magnitude of flood events: implications for flood frequency” by D. I. Kusumastuti et al.**

D. I. Kusumastuti et al.

Received and published: 24 June 2007

We would like to thank the Reviewer for the useful suggestions and comments to improve the manuscript.

Comments by Reviewer 2

The analysis of effects of non-linearity in runoff generation mechanisms on flood frequency is a topic of primary importance in hydrology. A previous paper that the authors do not mention was provided by Fiorentino M. and V. Iacobellis, Non-Linearity Effects in the Process of Floods Generation, Proc of the EGS Plinius Conference on Mediterranean Storms, 1999. In particular in that case the flood frequency derivation was

tackled with respect to different runoff thresholds depending on different generation mechanisms.

(We have adopted the suggestion and included the reference.)

Results provided in the reviewed paper are interesting and useful in the understanding of main characteristic of the probability distribution of flood events, nevertheless the following points could be better addressed in the paper:

1) The flood frequency curves in figure 7 for M3 and M4 models seem to show a shift in position rather than a change in the slope of the curve. Is this possibly due to the schematic representation of the deterministic rainfall-runoff model ?

Yes, this is possible due to the schematic representation of the deterministic rainfall-runoff model, particularly the difference in describing the storage-discharge relationship for subsurface flow.

2) What is the impact of different thresholds with respect to distribution moments of floods ?

The impact of different thresholds with respect to distribution moments of floods was not investigated in this study, since it is outside the scope of this study. This study remains a conceptual investigation of the underlying process controls.

3) The rainfall-runoff model completely neglect possible hydrologic losses due to infiltration as well as discharge component due to groundwater flow. Is this due to the lack of any observed base flow within the river?

Yes, there is lack of observed baseflow within the river. In view of the climate and soils in this region, the main runoff generating mechanism is subsurface stormflow, and infiltration excess runoff and deep groundwater flow are rare phenomena.

4) The evaluation of evapotranspiration and its annual variability is not mentioned as well as the variability in Eb and Eveg.

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We have adopted the suggestion and included the explanation of the evapotranspiration and its annual variability: “The range of measured annual potential evaporation values is between 1500 mm to 2000 mm. The runoff models developed in this paper used a fixed value of annual potential evaporation, equal to the mean annual potential evaporation of approximately 1700 mm”. Ebs and Eveg are calculated based on potential evaporation.

5) The parameter M is practically never mentioned within the paper apart from section 2.2. I assume that it is not that important with respect flood frequency which is to paper main focus. Then, is it absolutely necessary to introduce Eb and Eveg, thus replacing Ep, in models 3 and 4?

The authors agree with the reviewer that it is not absolutely necessary to introduce Eb and Eveg to replace Ep in models 3 and 4. The authors adopt those parameters in the models on the basis of previous modeling studies. The model structure presented here worked well for many catchments in this region.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 3, 3239, 2006.

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