Hydrol. Earth Syst. Sci. Discuss., 5, S2399–S2402, 2009
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Hydrology and Earth System Sciences Discussions

Interactive comment on "On the role of storm duration in the mapping of rainfall to flood return periods" *by* A. Viglione and G. Blöschl

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Received and published: 23 January 2009

The authors of this manuscript look at a simplified world to examine the relationships between return periods of rainfall and floods. The analysis emphasizes the effect of storm durations on the return periods and show that the storm duration is of considerably more importance than what is often assumed in practical estimations of design floods.

The analysis and mathematics seem correct, the results and conclusions are interesting, the topic is suitable for HESS and the manuscript is well written. I can therefore recommend it for publication in HESS after minor revisions. Below are a few detailed comments and suggestions.

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Interactive Discussion

Discussion Paper

Detailed comments

P3421, L13

"... literature design hyetographs ..." is counfusing, consider a change to something like:

"... accuracy of design hyetographs found in literature ..."

L 18

Change "They found them ..." to "They found the conditions ..."

P3422, L13

Change "analytical" to "analytically"

P3423

"... but are from intense bursts within these storms."

Alternatively: "... but are from the most intensive burst of a certain time interval within these storms."

P3425 L3:

Either change "the space" to "the parameter space" or put (i,t_r) before "space", as later in the manuscript. (This is the same for P3427 L23)

L4:

Unless I have misunderstood something, it seems more logical with "... smaller or equal to ..." instead of "... greater or equal to ...", since you are looking at the probability of not exceeding the flood peak value q_p. (This is the same for P3428, L1)

Eq (1)

T_r and I should be introduced as random variables

L14-19

It would have been interesting to see some examples of these distributions

P3426, L11-12

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Interactive Comment

It should be mentioned that these are parameters from the model fitted to a certain precipitation station.

P3427, L6
Page number missing in reference

L 19
Add "an intensity" before Φ

P3429, L4
Revise sentence (remove comma or change that to which?):
"The envelope of these lines, that maximizes ..."

P3430, L9-15
I think it is also possible to describe $T_Q < T_P$ in a more intuitive way. The reference to "two different filters are used for assigning T_P while a single filter is used for assigning T_Q" is for me a rigorous way of saying that there can in this case be two T_P - rainfall events in T_P years (for different storm durations), while there can only be one T_Q flood in T_Q years. Similar expressions occur on P3431, L23-26.

P3432, L4-6
Revise sentence. Consider something like:
"For all storm durations, there is a small difference in the relationship T_P/T_Q, dependent on the return period. T_P/T_Q is always below 0.5." If possible, it would be interesting to see an explanation to this decreasing relationship.

P3433, L18
Add ab after Fig. 3after Fig. 3: "Figure 5 is analogous to Fig. 3ab ..."

P3433, L24
I think the concentration time and average storm duration should be switched here.

L28
The last part of the sentence, from "which is related to ..." could be exchanged with

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something like "independent on the relationship ρ/t_c".

P3434, L19
Revise sentence: "For the durations commensurate ...".

L27
Revise sentence: "This probability distribution is called here ..."

L26-28
This part is a bit confusing. If I understand correctly, I think the first sentence should rather be something like:
"It is now of interest to understand/examine what is the probability that a maximum annual flood was produced by an event of duration t_r."

P3435, L8
Revise sentence: "... floods with more probability ..." (Higher?)

L 9
Maybe it is possible to add "flood generating" before t_r? A similar change is possible also in L13.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 3419, 2008.

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