

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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We would like to thank J. Skoien for his positive review and his useful comments which are addressed in the following (all line numbers refer to the original manuscript).

P3421, L13

"... literature design hyetographs ..." is counfusing, consider a change to something like: "... accuracy of design hyetographs found in literature ..."

We prefer to maintain the original statement, which is the one used by Alfieri et al. (2008).

L 18

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

Has been changed.

P3422, L13

Change "analytical" to "analytically"

Do you mean P3422, L8? We think this change should not be made because analytical relates to "approach" rather than to "derived".

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."

We prefer the original sentence as it is more general (and not too technical) at this stage of the paper.

P3425 L3:

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

This is correct, and the change has been made.

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)

Again, this is perfectly correct, and the change has been made.

Eq (1) Tr and I should be introduced as random variables

This has been added to the notation list at the end of the paper.

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L14-19

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

One example is the continuous line in Figure 7 (a and b).

P3426, L11-12

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

We added the sentence "(values calibrated using data of the Frankenfels raingauge, northern Austria)" at the end of line 12.

P3427, L6

Page number missing in reference

Page number added (page 455).

L 19

Add "an intensity" before phi

Has been added.

P3429, L4

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

Has been changed to which.

P3430, L9-15

I think it is also possible to describe $TQ < TP$ in a more intuitive way. The reference to "two different filters are used for assigning TP while a single filter is used for assigning TQ" is for me a rigorous way of saying that there can in this case be two TP - rainfall

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events in TP years (for different storm durations), while there can only be one TQ flood in TQ years. Similar expressions occur on P3431, L23-26.

Although intuitive explanations are always useful, we are not quite sure how the above statement links to the text on P3430, L9-15.

P3432, L4-6

Revise sentence. Consider something like: "For all storm durations, there is a small difference in the relationship TP/TQ, dependent on the return period. TP/TQ is always below 0.5."

We would like to maintain the original sentence because it refers to the curve maxima (i.e. to the critical storm duration).

If possible, it would be interesting to see an explanation of this decreasing relationship.

We believe this decrease is related to the shape of the IDF curve but we would have to explore this in more depth (eg. by sensitivity analyses) before making definitive statements on this.

P3433, L18

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

Has been added.

P3433, L24

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

We are not quite sure why they should be swapped.

L28

The last part of the sentence, from "which is related to ..." could be exchanged with something like "independent on the relationship δ_r/tc ".

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Apparently, our sentence was not clear and we have changed it to the following. "... is about $2t_c$. This can be interpreted as follows. For large return periods, the maximum tends to approach the time of concentration (for reasons consistent with the rational method) as there is a large number of storms that may produce that flood, so the distribution of storm durations becomes relatively less important. The time of concentration (when the water from the furthest point of the catchment reaches the outlet) is, typically, larger than the response time (eg. defined as the recession parameter), which may explain the maximum at twice the response time ($2t_c$). "

P3434, L19

Revise sentence: "For the durations commensurate ...".

We are not quite sure what should be revised here.

L27

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

This sentence has been changed to "The distribution of this probability"

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 ."

This is a much better wording and has been adopted in the revised manuscript.

P3435, L8

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

This has been changed to "floods with higher probability".

L9

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

Yes, this is a good point. "flood-producing" has been added in the manuscript.

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

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