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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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Review of the article: On the role of storm duration in the mapping of rainfall to flood return periods

By A. Viglione and G. Blöschl

GENERAL COMMENTS

I really enjoyed reading this manuscript. It addresses a fundamental topic (relationship between the recurrence intervals of rainstorms, Tp, and corresponding floods, Tq), which is seldom addressed by the literature yet still poorly understood. A supposed correspondence between Tp and Tq is an oversimplifying hypothesis which is

frequently questioned (see e.g., Yen 1990, Brath et al., 2001) and, surprisingly enough, commonly adopted (worldwide) in countless practical applications for the prediction of a design flood in ungauged basins.

Therefore, in my opinion the topic is of broad international interest and suitable for the journal. The manuscript is well written and to the point.

The methods and mathematics seem correct and support the conclusions of the paper, which are extensively discussed. The assumptions a rather strong, but the authors are very clear in stating that (1) this is a preliminary analysis which focuses on the role of storm duration on the relationship between Tp and Tq and (2) further analyses that relax some of the major assumptions are already in progress.

I only have a few minor comments on this manuscript, for which I recommend a Publication after minor revisions.

SPECIFIC COMMENTS

1 - p. 3422, line 24 "one is interested in the IDF curve for a duration 3h"

Reformulate this statement. There is no IDF curve is only a duration (aggregation time interval) is considered.

2 - p. 3425, lines 7-10 & p. 3427 line 7

The authors should highlight the (additional) assumption that the mean number of rainstorms equals the mean number of floods per year. Flood is usually defined as a peak flow exceeding a given threshold (also on Kottegoda and Rosso, 1997, p. 455). The authors could also comment on the possible implications of this assumption and its relaxation.

3 - Equations (6)

Units should be indicated for these empirical relations. Sivapalan et al. (2005) adopt a variable a1 to describe seasonality, which is neglected in this study instead. Also,

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the parameters of the empirical power laws were identified for a particular raingauge (Frenkenfels). An expected rainfall intensity that increases with storm duration is - at least in my opinion- a bit puzzling. Is the adopted value of b1 (0.01) statistically significant for the considered raingage and applicable elsewhere? The authors should briefly comment on this.

4 - p. 3432, line 5 "the maximum difference between ... depends on the return period";

I find this statement a bit confusing. Can we state: "the maximum difference between ... depends on the considered value of Tq." instead?

5 - p. 3434. line 10 "Delta_c". Do the authors mean "Delta_r"?

6 - Figure 8

A schematic that describes the main outcomes directly on a sketched Tq-Tp space would be very convenient.

7 - Lists

Also, in my opinion a bulleted list containing all the assumptions adopted in the study located at the end of the Introduction would be convenient too.

Finally, a notation list at the end of the manuscript (Appendix) would be helpful.

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