Hydrology and Earth System Sciences Discussions

Interactive
Comment

Interactive comment on "The geomorphic structure of the runoff peak" *by* R. Rigon et al.

Anonymous Referee #1

Received and published: 7 March 2011

General comment.

The paper is useful and interesting for a number of reasons. I believe it could be slightly improved in the introduction and conclusion sections, adding more comments and discussion about results and some more state of the art. Points to be discussed in the introduction/conclusions section are, in my opinion, the following.

1. section 1, page 1033, line 5-6: the authors refer to understanding "the highest peak-flow caused by rainfall with given return period". It is well known that, in most of engineering design problems the required input is the flood, i.e. "the peak-flow with given return period" rather than "the highest peak-flow caused by rainfall with given return period". It would be interesting to know whether (and if yes, to what extent) the authors believe that their findings could be extended to such a different quantity or not.

2. The evaluation of the critical rainfall duration for linear systems has been already

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

studied. For example, results of Fiorentino et al 1987, later exploited by Iacobellis and Fiorentino (2000), showed that using a gamma (Nash model) or a Weibull distribution function, the flow peak has a linear dependence on the rainfall excess intensity over a duration equalling the IUH lag-time (defined as the IUH average time). On one hand those results are consistent with the authors' finding (considering Eq. 22). On the other hand it would be interesting to check if a relationship arises between the authors' estimate of the critical rainfall duration and the IUH lag-time.

References Fiorentino, M., F. Rossi, and P. Villani, Effect of the basin geomorphoclimatic characteristics on the mean annual flood reduction curve, in Proceedings of the IASTED International Conference, Modeling and Simulation, pp. 1777–1784, Pittsburgh, Pa., 1987.

Iacobellis, V., & M. Fiorentino, Derived distribution of floods based on the concept of partial area coverage with a climatic appeal, Wat. Resour. Res., Vol. 36, No. 2, pp. 469-482, 2000.

Specific comments

1. Section 1.1, page 1034, line 4. The authors state that the $S(t)$ function, introduced as the integral of the IUH, "is the ratio between contributing area at time t and basin area". I believe that this is not a general property of the integral of IUH. The statement is true if the IUH is expressed in terms of the width function. The authors actually apply such kind of IUH, as they state at the beginning of section 2, nevertheless this should be pointed out before the S-function is introduced.

2. Section 1.2, page 1035, line 18; it is not clear why the authors state here that the rainfall duration which maximises the peak-flow "needs to be shorter than the concentration time" and how, at this stage of the paper, they can exclude it to be equal to the concentration time.

3. Section 1.2, page 1037, lines 2-4; while it appears clearly from fig. 3 that for some

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

values of m the Eq. (9) may provide multiple solutions, the physical explanation of such finding is unclear and not sufficient.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 1031, 2011.

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper