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Hydrology and Earth System Sciences
Discussions

Interactive comment on "The challenge of forecasting impacts of flash floods: test of a simplified hydraulic approach and validation based on insurance claim data" *by* Guillaume Le Bihan et al.

Anonymous Referee #2

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General comments:

The idea presented in this paper is interesting and potentially very useful. The paper is well structured and well written. The authors present a novel procedure aimed at computing a series of flood extent maps on a dense stream network and directly evaluating the possible associated impacts. The proposed approach consists of an integrated forecasting chain that combines a one-dimensional simplified hydraulic model and a distributed rainfall-runoff model for the simulation of discharges over the stream networks, and it has been tested on insurance claim data. Potential limitations and critical

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Discussion paper

issues in the implementation of the proposed methodology are also well documented and discussed throughout the paper. In my opinion, this paper can be considered for publication in the present form, after some minor points will be taken into account. Two main issues and some minor comments are listed below.

1. In section 2, the automatic implementation of 1-D hydraulic models is described; however, the description of the third step is too short and should be completed with additional information. Moreover, from figure 1 it seems that four steps (a-b) are required for obtaining the final map of flooded areas, that is not clear from the text. Finally, the choice of a fixed roughness coefficient is mentioned: a suitable reference should be inserted here. How is this value computed? And what are the possible consequences of keeping it fixed?

2. If I understood well, the application of the method exclusively focuses on the flood peak as the variable of interest. However, it should be stressed that other variables (like, e.g., the flood volume and the flood duration) may play a significant role to the study of extreme flood events, and that the dependence among such variables can seriously influences the estimates of flood magnitudes (see, e.g., Salvadori, G., De Michele, C., and Durante, F.: On the return period and design in a multivariate framework, Hydrol. Earth Syst. Sci., 15, 3293-3305, 2011).

Minor comments

- Page 5 - lines 16-17: You mentioned 10 flooded areas, but I could not find them in figure 2.a. Please also check the return periods reported on the x-axis in figure 2.b which differ from the one mentioned at the beginning of section 2.2.

- Page 6 - lines 23-24: Here, it may be appropriate to clarify that "the continuous discharge-impacts relations" are the continuous curves obtained by linear interpolation that express the relations between discharge return periods and number of impacted insurance policies.

- Page 8 - line 8: "September" and "June".

- Page 8 - line 15: I suggest to specify here that the rating curves are graphs of discharge versus stage for a given point on a stream, and maybe add a comment on how such curves are extrapolated in your work.

- Page 10 - lines 32-33: The sentence "It was worse testing if it could provide a number of private houses affected by the floods for each river reach to be compared to the outputs of the proposed forecasting chain" is not clear. Please, reformulate.

- Page 12 - lines 7: replace "figure 4d" by "figure 4.d". Please check the cross-references throughout the paper.

- Page 12 - line 33: A synthetic incoherent surface ratio is here introduced. I suggest to add a comment on such quantity and/or an appropriate reference.

- Page 13 - lines 22-23-24: Remove the space before the semicolon.

- Please check the punctuation of the figures' captions.

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