Nat. Hazards Earth Syst. Sci. Discuss., 3, C2858–C2860, 2015
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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Combined fluvial and pluvial urban flood hazard analysis: method development and application to Can Tho City, Mekong Delta, Vietnam" *by* H. Apel et al.

Anonymous Referee #2

Received and published: 31 December 2015

It is indeed remarkable that the hazard due to the joint occurrence of fluvial and pluvial floods has rarely been analysed, notwithstanding the practical importance of a combined treatment of the two hazard components and the existence of numerous individual studies on each of them. This paper proposes a new methodology for the joint hazard estimation and tests it for the interesting case of Can Tho City in the Mekong Delta.

The paper is timely, important and very well written. I only have a few comments which mainly relate to the presentation.

p. 4968 Perhaps the abstract could briefly mention HOW the fluvial and pluvial hazards

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were combined as this is the main innovation of the paper.

p. 4973 Typo: RapidEye satellite

p. 4979 The storm duration for the analysis was fixed to 1 h. You could say here that you do account for shorter bursts by disaggregation.

p. 4982 Typo: .. the hourly intensity 10 of the synthetic storm events was disaggregated into 60 ONE-MINUTE time steps (I presume)

p. 4982 Randomizing the location of the generated storm centres is practical and I have no objection but I suspect it will produce biases relative to point rainfall. If one sampled point rainfall from the generated rainfall fields one would probably not get the input distributions. Perhaps this should be discussed towards the end of the paper, including some judgement about the magnitude of the bias.

p. 4982 “For this particular study it can be assumed that fluvial and pluvial flood events are completely independent from each other.“ is perhaps a little confusing as you do account fort the co-incidence, i.e. their dependence, due to seasonality.

p. 4983 I had difficulties with section 3.3. It is clearly appropriate to account for seasonality, but the way this has been done was not fully clear to me, partly because of loose language. For example, I did not figure out what “probability of coincidence of fluvial and pluvial flood events“ is. Are you talking about probabilities of events to occur or exceedance probabilities of inundation depths? What does the equation exactly represent? The entire section 3.3 needs more attention.

p. 4984 “A set of joint flood events was simulated by combining fluvial and pluvial flood events with the same individual probability of occurrence.” Again, are you referring to the occurrence of events or inundation depths? The presentation was too short for me to figure out what has actually been done.

p. 4991 “4.5 Limitations of approach” really discusses the limitations of the results which is somewhat obvious. Instead it would be more interesting (for an international

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readership) to discuss here the limitations of the approach per se, i.e. what biases are introduced by the way the problem is framed and the assumptions involved. The interesting things to discuss here are the biases of the spatial rainfall model and the way the joint probabilities of inundation depths are framed.

p. 4999 Caption of Table 1: Suggest mentioning what FWTM stands for, and stating that FWTM has been assumed (as opposed to the estimation of R).

p. 5010 Caption of Fig. 10: probability of non-exceedance in a year?

pp. 5011-5013 Captions of Figs 11-13: The p-levels are apparently intended to quantify the expected probability of occurrence of the inundation depths and the quantiles the uncertainties. From the wording in the caption this is not obvious as p-levels and quantiles are different words for the same thing, so should be clarified in the captions. Please also add 'per year' to the expected probabilities (also in main text).

Recommendation: This is an excellent paper. A few clarifications would strengthen the paper. These are minor changes.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 4967, 2015.