Hydrol. Earth Syst. Sci. Discuss.,
doi:10.5194/hess-2016-496-SC1, 2016

Hydrology and Earth System Sciences
Open Access
Discussions

Interactive comment on "Reproducing an extreme flood with uncertain post-event information" *by* Diana Fuentes-Andino et al.

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Received and published: 3 October 2016

This is an interesting work that shows a probabilistic inundation map originating from a combination of different models and sources of uncertainty. We propose the following and we think necessary improvements. In introduction several significant and similar works are missing from references concerning the development of a probabilistic inundation map framework (such as Apel et al. 2006, Aronica et al. 2002, Aronica et al. 2012, Di Baldassare et al. 2010, Horrit 2006, Merwade et al. 2008, Merz et al. 2008). In particular, we believe that the analysis of Aronica et al., (2002), Horrit (2006) is one of the very first analyses that introduce the concept and methodologies for probabilistic flood map rather than deterministic one. Indeed, it is rather impossible to deterministically account for all the various uncertainties affecting a flood inundation and therefore, a probabilistic concept must be introduced and applied for all flood

analyses. In pg. 10, ln. 5-12, the Authors estimate a minor effect from the errors in channel depth on the simulated water levels. Also, the Authors apply a uniform distribution on several sources of uncertainty, like the channel's and floodplain's roughness coefficients, the channel's width, the downstream valley slope, the input hydrographs etc. Indeed, the aforementioned parameters can be important factors of uncertainty as also verified in Dimitriadis et al. (2016), through the application of Monte Carlo techniques to benchmark tests. Particularly, they observe that from the applied sources of uncertainty, in the form of uniformly distributed hydrological and hydraulic parameters, important ones are the roughness coefficients in channel and floodplain, followed by the inflow discharge Q, the channel width (which equals the model resolution at the analysis) and the gradients of the channel and floodplain, with the latter corresponding to the channel depth and exhibiting the smallest effect to the overall uncertainty. Also, they observe that for approximately all tested models, numerical schemes and flow conditions, the uncertainty decreases with increasing discharge, longitudinal gradient and channel roughness coefficient, while it increases with increasing floodplain gradient , floodplain roughness coefficient and model resolution. These findings can be helpful in a real case study that is based on Monte-Carlo techniques, since they can be used by the modelers to limit down the parameters to the ones corresponding to higher uncertainties, and thus, to save valuable time.

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