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Hydrology and Earth System Sciences Discussions

Interactive comment on "Deriving global flood hazard maps of fluvial floods through a physical model cascade" *by* F. Pappenberger et al.

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I have really enjoyed reviewing this interesting paper by Pappenberger et al. dealing with global flood hazard maps. The paper is well written and the numerical exercise scientifically sounded. Also, I like the idea of producing consistent maps for the entire globe. This consistency in mapping flood hazard can be a first step, for instance, in start understanding flood risk. Anyhow, given my enthusiasm for this topic (e.g. Di Baldassarre et al., 2011; 2012), I have some comments.

My main concern is the fact that this method was not validated against hard data, but only compared to another attempt to produce global flood hazard maps. Although the authors do recognize this limitation, I think that too much emphasis was given to this

benchmark study, which (I feel I must point out) has never completed a peer review process. As far as I can see, Herold et al. (2011) is a report published online, while Herold and Mouton (2011) is a manuscript published on HESSD that never went into HESS as reviewers' comments were not addressed.

Secondly, I see room for improvement in the rationale about the usefulness of global flood hazard maps. As I mentioned, I really like the idea of consistently estimating flood hazard at the global scale as this would improve our understanding (rather than "managing") of flood risk. However, this paper seems to underestimate this potential scientific relevance (e.g. understanding global links between flood hazards and global changes, human impacts on flood hazards, etc...), while overestimating the practical usefulness of these map for risk management, which in reality will always require local knowledge. For instance, it is stated that these maps can be used "for example deriving priority regions in which an upgrading of river defence structures may result in the highest return in terms of impact." Now, how can these maps suggest the need for updating defence structures when these maps are derived (according to the same paper) without considering the presence of defense structures? Also, how useful is (from a management viewpoint) such a coarse resolution map in most of the rivers of the world?

Lastly, the paper seems to suggest that the implementation of physically based model cascades (from precipitation to inundation) is the most appropriate approach to mapping flood hazard at the global scale. For instance, the word "successfully" is used twice in the sentence starting at the end of page 6617, without a clear explanation of these successes. In my opinion, if the final objective is to estimate inundated areas for large return periods, simpler approaches such as the implementation of probabilistic envelope curves (see e.g. Castellarin et al., 2009; Padi et al., 2011) should also be considered as possible alternatives. Essentially, it seems to me that this paper does not give sufficient credit to regionalization techniques, which have proven to be useful tools in estimating design floods in ungauged basins (e.g. Blöschl and Sivapalan,

1997; Merz and Blöschl, 2008).

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