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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Uncertainty in flood damage estimates and its potential effect on investment decisions" *by* D. J. Wagenaar et al.

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To begin, I have a general comment which you can disregard, but I found myself asking myself the question a few times. What is the intended purpose of this paper? I know it sounds strange, I know the "Purpose" from the Abstract. Simply stated "To compare different flood models, using uncertainty, with an example to trace it through to investment decisions". As I traveled through your paper, there were many cases I thought, there are three papers here. Firstly, compare different flood models. Secondly, how do we incorporate uncertainty into our estimation process for flood damage estimation, and how do these models that exist support that? And finally, what does that mean to our investment decisions. That being stated, I understand and appreciate the con-

nections that are inherent in these three topics, and can agree with the approach to touch on all of these topics in one paper. So, take the previous comment with a grain of salt, and understand that I am suggesting the separation so that the content of each topic can be covered with more detail and care (not to imply that this was not done with care, but that some detail had to be left out which may be critical to cover for the sake of brevity). This brings me to my first frustration with the paper. I will openly state, the issue here may be lack of common language and definitions. When referring to a model it seems there are two or three things that are generally meant. Firstly, a software package which computes a result from a variety of input parameters which typically include parameters describing the built environment and the hydraulic event parameters. Secondly, a methodology which is defined as a relationship of inputs and outputs, for lack of a better terminology, I am going to say a "functional relationship". I will elaborate, a simple unit loss methodology may only use depth as the input hydraulic damage driving parameter, a more complicated methodology or functional relationship may add conditional logic to determine if some other parameter is met. An example might be a D*V parameter, if D*V is greater than some critical threshold based on construction type and/or quality, than a more aggressive depth damage relationship will be utilized. Alternatively, there may be an even more complicated approach using some regression equation which eliminates the need for conditional logic and can provide a more explicit definition of the methodology rather than a piecewise equation. These three methodologies determine a priori the flexibility of customizing the software containing the methodology to be utilized in regional applications. I separate methodology from software because some software programs have many methods for deriving damage relationships, and some methodologies are better than others in allowing regionalization/customization of a generalized formula. Thirdly, there is a general approach across most (but not all methods) to use depth percent damage relationships. This is not a model per say, but rather what I would describe as an input to a methodology. In most products (that I am familiar with at least) a depth damage relationship is described as a tabular function with depth and either percent damage or actual dollar (or

euro) damage, and is a user customizable functional (albeit tabular) relationship. The HAZUS database contains a large library of damage functions from across America, and HAZUS-MH program can pull from those available default curves, but it allows the user to input any desired functional (tabular) relationship, if they would like. This allows for the potential for curves that describe construction practices in various countries to customize the software to fit their needs pertaining to the simple approach using depth alone as the forcing hydraulic parameter. The HAZUS-MH technical manual advises users to evaluate their floodplains and use more aggressive curves for damage in areas of high velocity, as well as areas with long duration. Although this is not explicitly considered in the methodology, it allows the user the ability to use judgment to improve the outcome of the model. In conclusion of this comment, I felt that the use of the term "model" was used in all three meanings at various points in the paper, and for the sake of clarity there may need to be some definitions and revisions of the paper generally pertaining to these concerns.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 607, 2015.