

Interactive
Comment

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

Anonymous Referee #2

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The paper presents a study on uncertainty in flood damage estimation and its implications on investment decisions for flood mitigation measures. Different types of uncertainty (epistemic and aleatory) and various sources for these uncertainties are qualitatively described. On this basis a quantitative uncertainty analysis framework based on Monte Carlo simulations is proposed. This framework is used firstly to analyse and compare the importance of different uncertainty sources in general and secondly to investigate the implications of these uncertainties on investment decisions within the application case of a dike breach scenario in the Netherlands. The paper is well structured and rewarding for the reader as it provides interesting insight into a highly relevant aspect in flood risk management. The main contribution of the paper is the conceptual outline of the uncertainty analysis framework and its application to a real

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world planning scenario. This application nicely demonstrates the practical relevance of considering uncertainties in risk based decisions.

Accordingly, in principle I recommend the paper for publication. However, covering the wide range of aspects concerning uncertainty, uncertainty analysis and practical implications on investments is quite ambitious for one paper and thus requires a careful description of and reasoning for simplifying assumptions and limitations. Further, I see some aspects which require minor revisions or complements to make the paper stronger of which the major ones are the following. Please find further minor comments and typos in the attached marked-up manuscript.

1. Section 2: please be more coherent in the description of the uncertainty sources for the different elements of flood damage modeling particularly concerning the distinction of uncertainty types (epistemic and aleatory) in reference to table 1. It would be helpful to make clear which type of uncertainty is described. Further, in Table 1 the uncertainty sources and types which are considered in the study should be highlighted.
2. Section 3: Overall this section should be linked more strongly to section 2 by providing arguments which qualitative sources of uncertainty are considered and why. One paragraph at the end of section 2 might be suitable. What is the motivation to select the specific models? Why do you focus on residential buildings and companies? Are there specific reasons or is this done arbitrarily? This choice should be explained as it is taken up in the discussion (cf. p 626). How are model results used if only one sector is included in the model, e.g. Tebodin; Billah 2007 (cf. p. 619)? The resulting damage will be less than for models which cover both sectors considered?
3. Section 4: For non-normal distributions the coefficient of variation is a biased estimator of variation. Obviously you have to deal with multi-modal distributions and I recommend using a non-parametric measure to quantify variation, e.g. IQR/Median.
4. Section 5: For the reader it is hard to follow the line of argument and interpretation of results without knowing the details of the methods provided in the references Kind

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(2011), Kind (2013) and VNK (2014) - some of them are written in Dutch. You should provide more details about the methodology and assumptions so that the reader is able to understand it from your paper. Also, you should explain the abbreviations used in Table 3.

Please also note the supplement to this comment:

<http://www.nat-hazards-earth-syst-sci-discuss.net/3/C572/2015/nhessd-3-C572-2015-supplement.pdf>

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

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