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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Numerical simulation of levee breach by overtopping in a flume with 180 bend" *by* S.-T. Dou et al.

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The authors would like to thank you for these valuable comments and suggestions, which undoubtedly improve our submitted manuscript. The authors considered all the comments seriously and made corresponding modifications in the new version of the manuscript. In the following parts you can find our reply to your comments:

General Comment: 1) The introduction portion is unduly expanded. Researchers/practitioners reading this work can be expected to be familiar with most of the literature presented. I would recommend taking out most of the introductions and leaving the bare meat. Re: The introduction is a little too detailed. In order to make the paper more concise, we deleted the introduction about WENO-Roe method as it is not

the emphasis of the paper.

Specific Comments: 1) In section 2.1 Wu et al are credited (through a reference) for the SWE, citations must be from original work not from tertiary sources. Please include an original citation or reference a standard fluid text book. Wu et. al did not develop the SWE. Re: The SWE form used in this paper are cited from works of Wu et. al, but this form of SWE was not developed by Wu. Now it is quite difficult to find the original work and we verified this rationality of this form of SWE, so the citation here is deleted.

2) What eddy viscosity formulation is utilized in the model? Re: The diffusion term can be ignored in levee breach problems because of the specific characteristics of levee breach flow and the dominant role of the convection. The SWEs in this paper also excludes diffusion forms in order to improve calculation efficiency. So in this model we did not deal with eddy viscosity.

3) The advancement claimed by the authors is the inclusion of a bed scour model, however no details are provided on bed handling, sorting etc.. Re: Bed scour model is an important component of the whole model, but it is not the key point of this research and the approach in for this model is ordinary, so the details were omitted.

4) Bed handling description is especially important in view of the semi-implicit scheme claimed by the authors. Does the model scour through a single layer time step, or can it scour multiple layers in a time step? Re: In order to improve the calculation efficiency a semi-implicit scheme was used in the bed scour model, so the time step of scour model can be much larger than that of flow model. In the model we set the whole sediment as a single mix layer and after every time step the composition of this layer will be adjusted according the amount of sediment carried by flow.

5) The results need to show how well the model reproduced the scour and expansion of the breach because sediment dynamics is the primary advancement in this paper. Section 3.3 hints at broad agreement but the agreement is not shown anywhere in the text. Re: According the data collected, we add a table which includes final width of

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the breach derived by measuring and calculating, in which we can show how well the model did.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 3935, 2013.