Natural Hazards
and Earth System
Sciences

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Discussions

Interactive comment on "Multilayer-HySEA model validation for landslide generated tsunamis. Part II Granular slides" *by* Jorge Macías et al.

Anonymous Referee #1

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General Comments:

As was the case for the first part of this paper, this is once again an informative paper that allows the modeling community to get a feeling of the reliability of the simulations performed with the Landslide-HySea and Multi-layer HySea model when used for real-life hazard assessment studies. This work presents results of modeling 3 of 7 benchmark problems proposed by the National Tsunami Hazard Mitigation Program (NTHMP). The three problems are based on data collected via experimental studies on tsunami generation by 2-D and 3-D, deformable slides from aerial and subaerial initial positions. The Landslide-HySea version of the code is used to represent the slide dynamics by means of a Savage-Hutter approach. This is coupled with the Multi-layer HySea version to capture the dispersive dynamics of the hydrodynamic phase.

The topic and results presented in the paper are within the scope NHESSD topics. The paper provides a sufficiently (perhaps too much) detailed description of both, the governing equations modeled in the code and the numerical algorithm implemented to resolve the system. Additional references are provided for readers interested in additional details. Given the complexity of the mathematical modeling and numerical scheme employed to solve the equations, one wonders whether the reader should be referred to a separate publication for that explanation, and the manuscript could be focused on the modeling setup and results alone. The authors provide and adequate literature review of pre-existing validation efforts in the introductory section of the report. They also provide a description of the numerical implementation of the laboratory experiments used for the validation. The results of all three experiments are presented in a clear and concise manner.

I have not really found any major issues with the paper and I am ready to recommend publication with very minor modifications:

Specific Modifications:

-pp1 l.7: Here and in a other location(s) in the paper the term "approved" is used to refer to the NTHMP process of testing codes. It should be corrected to "validated" or "tested" as the NTHMP does not "approve" or "certify" any models. Please check with NYHMP for clarification if needed.

-pp1 l15-17: The authors mention the workshop consisted of 7 benchmark problems (3 were presented in Part I of the paper and 3 in this Part II), it would be good to explain if the missing problem was attempted and what results were obtained.

-pp 8, l181-182: Please, specify what boundary condition is applied where for each of the three BCs specified in the equations.

-pp14,18, 23: For all benchmark problems, please specify how parameters (r, na, nm,...) were selected or whether they were provided with the data. Also explain how

Dx (delta x), Dy (delta y) is selected

-pp17 l313: Please, correct units of density (km/mˆ3)

-pp17, l316: Please, replace "consists in" with "consists of", wherever it appears in the paper.

-pp23, l370: It would be interesting to know whether the non-dispersive case of 1-layer was attempted and how the results would compare with the multi-layer cases. If available, please add.

-p23, l371-376: The description of how the slide is initiated is unclear. Please, explain with more detail. Is the entry velocity specified? If not, how it is reached? What is the function of the pneumatic pistons?

-pp24, Figure 10: I would suggest using more distinguishable colors for the lines in the top panel, it is hard to tell the Grain from the Grain Velocity lines. -Please, be more detailed in the legend, specify what magnitude is represented by "Grain". -Does the vertical axes represent position or velocity? Perhaps, the left axes should be used for distance and the right one for velocity?

-pp27, Figure 12: Please specify if number in top left corner refer to x-, y= (positions)

Some stylistic corrections (these are some of the corrections needed, but not all, please scan the document for additional typos):

-pp4, l 99: Please correct to " initiative which the present work is based on"

-pp6, l144-147: move : "…, the ratio r is also constant (rho_f and rho_s are also constant)" from line 147 to line 145.

-pp6, l154: Please replace "vertical variable" with "vertical coordinate".

-pp9, l197: Correct: "The Savage-Hutter model that is used and …."

-pp12, l238: Please, spell out "HLL"

-pp13, l276-280: The first sentence is repeated almost literally. Please, correct.

-pp14, l304: What is meant by "no longer"?, Please word correctly.

-pp25, l405:, Correct: "In can be…"

pp.28: l415: Please, correct: to "The present work aims at benchmarking the model…"

pp.28, l432: Correct to: " Savage-Hutter used here".

pp.29, l452: Correct to: "data compared with, …"