Review of: Lituya Bay 1958 Tsunami – detailed pre-event bathymetry reconstruction and 3D-numerical modelling utilizing the CFD software Flow-3D

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Overview

This paper deals with the simulation of a subaerial rockslide impacting a waterbody with the software Flow-3D and its application to simulation of the the Lituya Bay 1958 tsunami.

First, authors tackle the problem with a simplified 3D-model of the impact area (Gilbert inlet) and later, authors consider real topo-bathymetric data and the model is also enlarged to simulate the whole flooded area and the measured trimline provided by Miller, 1960. In the complete case, authors use different cell sizes and different friction coefficient for the topography in order to simulate the complete scenario.

Overall Recommendation

My recommendation is: minor revisions.

Assessment and Further comments

Some comments and questions are organized by sections.

1. Introduction

Reference cited in line 10 correspond to the year 2019, not to 2018.

My point here is the concept of what is called “denser fluid”. As it’s recalled in the paper, Pararas Carayannis classify this slide as a “subaerial rockfall” while Miller describe it as a slide in a midway between a landslide and a rockslide. The use of a “denser fluid” to recreate the slide is an approximation to the modelling of this event, nevertheless it should be remarked that the authors modelling is nearer to the Miller and Fritz approximation as a landslide. In this sense, as authors remark, the used model is limited as authors must add a virtual wall on one side to avoid the spreading of the sliding mass during the landslide. Is there a remarkable difference if this wall is not considered?

3.2.1 Solver methodology

As different roughness values are used, I would like to see how this friction is parameterized in the model.

3.2.3 Models description

In this section and later, authors describe the computation time that takes the different simulations. Although it's a useful relative value if we compare the different computation times described along the paper, I would like to know what computational resources are used in order to imagine the real computational effort needed to reproduce these experiments.

4.2 Wave formation and run-up

Again, in page 13, lines 9-10 authors speak about computational time. With the same computational resources as before?

4.3 Impulse wave propagation

Again, same question about computation times in page 14, lines 17-18.

To my view, the discussion presented in page 15, lines 15-24 makes non much sense as the modelling process is approximating a rockslide or a landslide-rockslide by a landslide by means of a "denser fluid". I you don't want to remove this paragraph I would suggest remarking that this simulation of the submerged propagation of materials would not valid for the Lituya Bay event unless it would be considered as a pure landslide event.

5. Discussion

In page 17, lines 3-8, authors discuss that they don't find differences nor in inundation neither in the trimline with different roughness values from 0-3m. I can understand these results around steeper areas, but are there no differences in the Fish Lake area? What about around the Eastern flat area around the Paps? I cannot understand how the model doesn't provide larger inundation areas around flat areas when the roughness values go to zero.

6. Conclusion

Page 18, lines 30-34. Please, remark that these conclusions should be valid for landslide simulations. In the case of rockslides, Flow-3D can offer good approximations but with the limitations of the physics included in the numerical model.

Just to change chapter by section in line 37.