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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "A comparison of a two-dimensional depth averaged flow model and a three-dimensional RANS model for predicting tsunami inundation and fluid forces" *by* Xinsheng Qin et al.

Xinsheng Qin et al.

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The authors would like to thank the reviewer for time and the insightful comments. We have incorporated these comments into the revised manuscript and hope that we have addressed any concerns. Specific responses to review comments are shown below.

Page 1 - 5: I would suggest if the Introduction can be tailored to a broader audience and be more concise in terms of purpose, application and scope of the paper. Most of the existing introduction can then go under a section on Previous Work. Also the authors

could include examples (in possibly a separate section) of existing coastal structures in tsunami inundation areas that have utilised 2D or 3D modelling studies to determine forces on structures. You might want to cite: Ingraffea, Nathan & Libby, Mark, 2015. Design of a Tsunami Vertical Evacuation Refuge Structure in Westport, Washington. Structures Congress 2015, pp.1530–1537. González, Frank, Randy LeVeque, and Loyce Adams. "Tsunami Hazard Assessment of the Ocosta School Site in Westport, WA." (2013)

The first section has been re-arranged to include two sub-sections. The scopes and goals of the paper are more explicitly introduced and summarized in section 1.1. The example above and some explicit goals of the paper are added as the last two paragraph of section 1.1.

Page 1, Line 10: The line should read, "However, it is not clear whether these equations ..."

This has been modified in the manuscript.

Page 3, Line 24: Has not the increased computing power affected both tsunami runup process and wave impact on an individual structure.

This has been addressed in the manuscript.

Page 8, Line 17: space after i,

A space has been added.

Page 9, Line 33-34: the line should read, "..., causing the measurement to oscillate dramatically."

This has been modified in the manuscript.

Page 13, Line 13: the momentum flux in equation 20 is in parenthesis so replace denominator by parenthesis

This has been modified in the manuscript.

Page 15, Line 1: delete in the experiment. The sentence already makes it clear that the sampling rate is for the experiment.

This has been modified in the manuscript.

Page 15, Line 7: Define CSZ here i.e. Cascadia Subduction Zone.

CSZ has been define earlier in the first paragraph of section 4.1.

Page 28 - 30: The conclusion may be strengthened by suggestions for the practitioner as to when might it be useful to utilise three-dimensional model studies rather than two dimensional studies in designing coastal structures within tsunami inundation areas and whether the increased computational power is really necessary or not. This point may be connected to looking back on what may have been done differently when determining forces to design for example the Tsunami Vertical Evacuation Refuge Structure in Westport.

Some suggestions have been added to the conclusion section.

Figure 3. Add legend, remove grid, add one label for time and velocity along x and y axis respectively so you can then remove Abscissa: time (s) a. Ordinates: velocity (m/s) from the caption

While we understand the intent of this comment, we feel that adding labels for time and velocity along x and y axis would create an odd aesthetic for the figure and have chosen to leave this figure as is.

Please also note the supplement to this comment:
https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2018-150/nhess-2018-150-AC1-supplement.pdf

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