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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "The effect of uncertainty in earthquake fault parameters on the maximum wave height from a tsunami propagation model" *by* D. Burbidge et al.

D. Burbidge et al.

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Thank you for your review. Detailed responses to specific comments are below. The original text from the review is in quotation marks.

"The manuscript of Burbidge et al. presents a very useful methodological study addressing the role of source parameter uncertainties in the computational-based tsunami hazard analysis and early warning. By means of systematic processing of huge number of scenarios from simple to more complex numerical setups, Authors provide a comprehensive view on the highly heterogeneous uncertainty propagation over

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the whole computational domain. These results are of key importance for methodological progress in PTHA as well as early warning.

I recommend publishing the Manuscript with some minor corrections. In particular:

3371:1-3: When listing physical parameters influencing the tsunami wave field, one should, probably, start not with tides and dispersion but with source parameters and bathymetry since these are most important."

Response: OK. We will change the order in this sentence.

"3371:15: Remove reference to Davis et al. (2015) – paper is only “in preparation”."

Response: The paper has since been accepted and is now “in press”.

"3371:last line: remove comma after “epistemic”; same for 3387:27"

Response: OK.

"3372:16: explain abbreviation “SD” (=standard deviation)?"

Response: Yes, it means standard deviation. This will be added to the text.

"3372: Eq.1: should be power 2 for the difference under the root"

Response: OK. This was a typo.

"3373:13: “affected” instead of “effected”?"

Response: Yes it should be “affected”.

"3374: At the very end of the Section 1, after Authors have formulated the two main questions: I’d like to read something about their interpretation of these questions. Why do they ask these questions? Why these are important? In particular, if the first question is answered with “no”, what does it mean for PTHA (or source inversion, or forecasting)? Similiraly, what “normal distribution of hmax” would mean in the same context?"

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Response: The implications of “no” is the main topic of the discussion. However, we agree a sentence or two describing of motivation would be good here. We will add some. The main reason to ask these questions is to test if these assumptions can be used for PTHAs and/or real time tsunami forecasting or not.

"3376:11: At this point it is not clear what is the longitude 181.25_. Because there is no reference to grid coordinates in the text. Authors only report grid size (80_X80_ or 80_X42_). One can see from the figures (e.g., Fig.4) that the grid ranges from 140_ to -140_ by longitude. However, not from the text."

Response: OK. We will add that the extent of the boxes (in degrees) to the text.

"3376:13: Instead of “step” in bathymetry, I would say “reflecting wall” (would be easier to understand the model setup)."

Response. OK. We’ll add “. . .and a reflecting wall (ie a step up in the bathymetry. . .”

"3379:11: remove “NetCDF files”. Should be: “... a mix of Golden Software format produced by EasyWave and ...”"

Response: OK.

"3379:11: Golden Software, probably, should be referenced or copyright symbol must be used."

Response: OK.

"3377:23: If a single fault model with uniform slip distribution and plane rupture was used all the times – what was the reason to discretize sources into 10km x10km sub-faults? Why not just taking one single patch with given length, width and slip?"

Response: True. This was to allow comparisons to the CoV from non-uniform slip models on the same 10x10km grid. We’ll add something to this effect to the paper.

"3381:16-18: Interpretation for the minor assymetries? Limited length of random sam-

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ples (N=100)?"

Response: Yes, and small numerical errors (eg roundoff).

"Sections 3.2.x: Authors are very laconic in their description of effects of individual parameters. Actually, they only refer to the Figures. In particular, they do not provide any interpretation at this point, postponing it to the Discussion. However, I think, some minimal interpretation would be nice to have also at the end of each section. At least, at the end of section 3.2.1 (Strike), after describing Figures 4 and 5. In particular – what do these Figures tell us in context of PTHA, forecasting, etc.?"

Response: OK. We can add one or two sentences here or there. However, we don't want to simply repeat the text in the discussion.

"3386:25: I suggest to remove word "probably" cause there is no any other option. All these parameter variations do nothing more as changing the initial deformation pattern."

Response: True, "probably" will be removed.

"3391:6:Reference: I suggest using following reference to easyWave: http://trac.gfzpotsdam. de/easywave"

Response: OK

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 3369, 2015.