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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Probabilistic tsunami inundation assessment of Kuroshio Town,Kochi Prefecture, Japan considering the Nankai-Tonankai megathrust rupture scenarios" *by* Katsuichiro Goda et al.

Anonymous Referee #6

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Manuscript by Goda et al. presents a very high resolution tsunami inundation assessment at a local level (Kuroshio Town, SW Shikoku island, Japan) for 1000 stochastic rupture scenarios along the Nankai-Tonankai trench with magnitudes 8.7-9.1. The ultimate goal is to demonstrate variability (and hence uncertainty) of inundation parameters resulting from various slip distributions. Awareness about such variability is critically important for tsunami mitigation planning at local scale – here I fully second the Authors and, moreover, in my opinion, this is the main âĂŽto take home' message from the current study.

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The Manuscript is very well written. Indeed, from my own experience as a reviewer, initial submissions of that high readiness level are rare exclusions. I would like to thank Authors for the thorough preparation of the Manuscript. Summarizing, I think the Manuscript can be published with minor revision. Below I list my three most principal suggestions followed by less important issues.

(1) You should change the title from "Probabilistic inundation assessment“. Because what you are doing is not a âĂŽprobabilistic assessment‘ in common understanding. This term was long ago privatized by studies (PSHA, PTHA) aiming to assess probability of hazard occurrence in time. Looking at your title, reader would expect to find typical PTHA products – hazard curves, hazard maps for various return periods – but won‘t find them in your study. There is no time dimension in your study. Please change the title to avoid misleading readers and search engines. For example, "Tsunami inundation assessment for Kuroshio Town .... from stochastic rupture scenarios along the Nankai-Tonankai megathrust“.

(2) It is not clear from the text if Authors have simulated tsunami propagation and inundation for the 11 CDCM source models themselves, or CDCM scenarios were calculated elsewhere. In the latter case, differences by inundation and coastal wave heights (Fig.5 and following figures) between the stochastic and CDCM models may be attributed not solely to slip distribution but also to the generation, propagation and inundation modeling stages. To avoid such mixing, Authors have to simulate CDCM scenarios exactly within their framework.

(3) Authors have limited the lower bound of magnitude range to 8.7. Looking at the histograms on Fig. 11 and 12, one may assume that smaller magnitudes could also trigger dangerous inundation (that is also well known from the history). Hence, by not considering scenarios with M<8.7, Authors effectively constrain their analysis from below and neglect the large amount of hazard-relevant scenarios. I am not invoking Authors to complete their scenario database but just propose to make a correspondent note in the text (e.g., in conclusions).

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Lines 47-52: These four sentences are, in my opinion, very important. I propose to replicate them (with necessary adaptation) in the conclusion part.

Line 158: Symbols for the rigidity lost in the equation.

Line 235-237: Was the breakwater modeling directly incorporated into the NLSW code? Please describe the adopted numerical technique in more details (e.g., modification to volume conservation).

Line 244: Spacial smoothing 9-by-9. Why "9-by-9“? Looks grid-dependent. Any benchmarking against Kajiura or Nosov&Kolesov methods?

Line 247: TUNAMI code family has different members. Which TUNAMI version was employed?

Line 284: Any explanations for P1/P2 versus P3?

Line 306-307: I do not agree with this interpretation. The blue 50% line is in average above 1.0.

Line 308-309. I do not agree with this interpretation. For M8.7-8.9 cases, CDMC results are also closer to the 50% (solid) line. For me it is obvious from Fig. 7.

Lines 333-334: "reasonable degree of similarity“ in what?

Lines 387: Sentence not closed.

Figure 11: Y-axes show "Probability“ of what? ’Probability of inundation’ usually implies probability of occurrence within given period of time (’return period’ in classical PTHA studies). I suggest to avoid using the term "probability“ at this plot. Alternatively, Authors could plot "Scenarios count“, or rename "Probability“ into "Fraction of scenarios“.

Same Figure: Add vertical dashed line showing the height of the evacuation platform. Information on tower basement elevation is not needed as long as inundation depth is presented.

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