Journal: NHESS

Authors: Vitturi et al.

Title: *Probabilistic tsunami hazard assessment at Stromboli volcano: 2. New simulation database and probabilistic inundation maps and curves*

General comments

I very much appreciated the opportunity to review this manuscript by Dr. Vitturi and the colleagues. This study presents a first probabilistic tsunami hazard assessment (PTHA) attempt for Stromboli volcano and, in my view, is a carefully conducted and well-written contribution with a clear and accessible structure.

This work represents the second part of a two-paper study addressing tsunami hazard assessment associated with landslide-generated tsunamis specific to Stromboli volcano, where probabilistic treatment is generally challenging because the hazard is highly localized, low-frequency, and constrained by limited historical observations. In the companion paper (Paper 1), the authors review past events and describe the expert elicitation process, whereas this manuscript (Paper 2) incorporates the elicited elicitation into two numerical simulation catalogs to perform PTHA. The study eventually provides probability maps on Stromboli and probability curves at specific locations, which can serve as practical guidance for hazard evaluation. Although this manuscript builds upon the companion paper, it is sufficiently self-contained and can be understood independently.

I consider this study to be an important and pioneering contribution in that it enables PTHA for localized tsunami hazards under limited observational constraints by explicitly incorporating expert judgement into a probabilistic framework. The assessment is also conducted with considerable care. In addition to discussing uncertainties associated with expert elicitation, the authors thoughtfully examine model-related uncertainties through comparisons of DEM resolutions and tsunami simulation models, which help stakeholders understand how the outcomes contain different types of uncertainty.

I do not find any major issues in the analysis, data presentation (except for a few cases of apparently missing information in some figures), or the conclusions drawn from the study. For these reasons, I conclude that this manuscript is suitable for publication in NHESS after minor revisions addressing the largely minor points listed below.

Specific comments

L110. Some of the TQs do not seem to be used in this study (e.g., TQ1–2 and TQ5–15). I understand that these questions are described in the first companion paper; however, to make this second paper more self-contained, I recommend that the authors explain why the questions listed in Table 1 were selected, what the others were, and why they did not have to consider them here.

Figure 2. Although the figure caption and the text (Line 283) state that the figure shows two DEM cases (10 m and 20 m), only the 10 m case is shown.

Line 391. Please consider revising this sentence to "*Probabilistic maps for a fixed exceedance threshold of 0.5 m obtained from Databases A and B are presented in Figures 5 and 6, respectively*."

Figure 7. At first glance, it is difficult to distinguish the differences among panels a–d, as all panels are labelled identically as "50th." Please consider adding labels such as 0.1 m, 0.2 m, 0.5 m, and 1.0 m directly to each panel, rather than indicating them only in the caption. Also, the panel "c" character is smaller than the others.

Figures 8, 9, 10. I recommend that the authors add appropriate titles to each panel, as in Figure 12, so that readers can more easily distinguish the differences among the panels.

Line 444. Please consider revising this sentence to "*The probabilistic inundation maps corresponding to a 10% exceedance probability in 50 years, obtained from Databases A and B, are shown in Figures 8 and 9, respectively*."

Figure 12. The curves in Figure 12c–d may be missing, so I could not evaluate the results described in Lines 520–529.
—Later, after reading Line 679, I wondered whether the probability is effectively zero in these cases. If so, please consider noting that the curves lie nearly on the y = 0 axis to avoid reader confusion (as happened to me), both in the figure and in the text (around Line 520).

In Supporting Information

Text S1. The authors refer to a figure showing the logic tree of the question structure (Line 6. *These questions are structured in a logic tree (see Figure.*), but they may have failed to show it.

Technical corrections

L23. Remove “the” in “the over the next 50 years”

L90. As “target questions” is abbreviated as “TQ” later, please define it at first use here.

L226. STV should be in quotation marks (“STV”)

L238. The subsection number of “Methodological framework for probabilistic hazard assessment” should be 2.4 (not 2.3), and the subsubsections should therefore be numbered 2.4.X as well.

Line 463. Please specify which figures are referred to in “In all panels of both figures.”

Line 523. Please specify which figures are referred to by “In all panels of both figures.”

Line 622. This paragraph is too long so I suggest the authors consider dividing it into a few paragraphs, if possible.