

## ***Interactive comment on “Assessment of the 1783 Scilla landslide-tsunami effects on Calabria and Sicily coasts through numerical modeling” by Filippo Zaniboni et al.***

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**AUTHORS ANSWERS TO REFEREE #3's COMMENTS** The suggestions and comments by this referee have been useful, and many of them have been integrated into the manuscript. The new version of the paper, with changes evidenced in red, has been attached.

Main comments:

This manuscript describes new analysis of previous studied 1783 Scilla landslide. The analysis in this paper is focused on the inundation of the generated tsunami in the

C1

areas close to the landslide. It also includes a reconstruction of the topography to fulfill the historical observations. The paper is very interesting, and I liked the open and transparent way the results are presented. Good and clear figures. I have suggested minor revision with some suggestions to improvements below.

1) Discussion of results of simulations on Grid2. Line 16 on page10: Looking at the maximum surface elevations of Fig. 5, the main argument for not achieving observed runup at location 5 and 8 is the resolution of the grid. Why not perform grid refinement tests? I guess that the resolution is high enough for propagation in the deepest part of the strait. 0.3 m before runup cannot give 2 and 3.2 m runup. \*\*\* ANSWER \*\*\* Grid refinements in the harbors of Reggio Calabria (#5) and Messina (#8) could account for higher waves, associated to the tsunami itself and to resonance phenomena. This very interesting task has not been explored yet, and it is indicated as one of the topics deserving attention for future work.

2) What is the original resolution of the data SRTM and GEBCO used in this paper \*\*\* ANSWER \*\*\* A more detailed description of the original datasets and of their use to obtain the computational grids have been added (page 8 lines 15-19).

3) Grid refinement tests – should be shown or at least referred to for all grids (not only the 50 m grid, but in sea and on land for 10 m grid) \*\*\* ANSWER \*\*\* The grid refinement has been done and discussed only for the area of Capo Peloro, showing the improvements brought by such procedure. It can then be applied to other areas of interest, where detailed historical reports are available, such as Messina and Reggio Calabria harbors as well as the coastal area of Punta del Pezzo, about 7 km west of Scilla along the Calabrian coast. As already stated above, this is left to further studies.

Minor comments 1) Table 1 – must have a ref. to Fig 2 \*\*\* ANSWER \*\*\* Done

2) Line 1 page 7: what is "cellular automata" \*\*\* ANSWER \*\*\* It's a simulation technique, described and applied in the related paper, that is not worthy of description here.

C2

- 3) L5 p7: check super scripts: m3->m<sup>3</sup>, m2->m<sup>2</sup> etc. Check entire paper \*\*\* ANSWER \*\*\* Done
- 4) L8 p7 vs L18 p7. Inconsistent use of "million" and "M". Check entire paper \*\*\* ANSWER \*\*\* Ok
- 5) Fig 3: a vertical line at shoreline will help reading the figure. Include also the location of "blocky deposit", not only simulated deposits \*\*\* ANSWER \*\*\* A horizontal light-blue line has been added, marking the sea level. A profile of the blocky deposit is not available
- 6) Fig 3: Use of only end-parentheses for dividing the text for different panels. I think it is better to use colon (Check rest of paper) \*\*\* ANSWER \*\*\* Ok, done
- 7) L8 p8: Higher grid resolution give more accurate results must be more discussed. Resolution of grids and data, stability etc. \*\*\* ANSWER \*\*\* As already mentioned above, these issues have been discussed for the Capo Peloro area. Such details are interesting but too specific for the aims of this work.
- 8) L14 p9: the sentence starting with "The picture of : : ." must be revised – I could not understand what was meant here \*\*\* ANSWER \*\*\* The sentence has been slightly modified (Page 10, Lines 7 of the new version)
- 9) Chap 5.1 – I think some mariograms for 3-4 locations also could be fine for better understand the wave pattern \*\*\* ANSWER \*\*\* We decided to omit the virtual marigrams obtained by the simulations for two main reasons: i) there are not instrumental records to compare with; ii) they did not add particularly interesting information to the already shown plots (propagation and maximum water elevation).
- 10) Fig 6: include also depth toward location 5 and 8. \*\*\* ANSWER \*\*\* This remark is not particularly clear: the picture shows the area covered by Grids 3 and 4, not including the harbors of Messina and Reggio Calabria, located southward.
- 11) L19 p 11: what is meant by "this zone"? \*\*\* ANSWER \*\*\* No "this zone" exists at C3

the indicated line and page. There is "coastal zone" (at Page 11, Line 27 of the new version), that is clearly referred to the Sicilian region, already cited twice in the same sentence and not repeated.

12) L21 p11. Revise sentence "If in Calabria: : :". Show the lowland of Capo Peloro in a map? \*\*\* ANSWER \*\*\* The Capo Peloro lowland and Calabria coasts are shown clearly in Figure 6.

13) L18 p13: What is meant by (#1), similar L32 p18 (#2). Is it "Grid 2"? \*\*\* ANSWER \*\*\* To avoid continuous repetition of the word "grid", sometimes they have been referred to only using their number ("#1" is for Grid 1, "#2" for Grid 2 and so on).

14) Fig. 11 upper panel. For better comparison to Fig 8, use same scales! \*\*\* ANSWER \*\*\* Correct remark, the water height scale and the color palette of Figure 8 in the new version match those of Figure 11.

15) L12-14 p18: Check sentence \*\*\* ANSWER \*\*\* Done.

16) L30 p18: "inundation does not fit observations"??? See L12 p18 and bulletpoint at L28 p19 and elsewhere where you have concluded that the simulations is a good reconstructions. \*\*\* ANSWER \*\*\* The three reported sentences refer to three different contexts: the first concerns the 50-m grid simulation, not fitting the observed run-up and then justifying grid refinement; the second refers to the simulation of the 10-m grid in Scilla beaches, presented in the previous paper (Zaniboni et al., 2016); the third one discusses the good agreement reached with the morphology reconstruction adopted for Grid 4.

17) L6 p19: "basing" use based instead? \*\*\* ANSWER \*\*\* Ok, fixed.

18) L12 p19. What is meant by "better resolution" – finer grid or higher resolution of the data \*\*\* ANSWER \*\*\* It means a finer grid, and it is explained later when excluding option 2 (Page 19, Line 28).

Please also note the supplement to this comment:  
<https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2019-94/nhess-2019-94-AC3-supplement.pdf>

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