In blue: reviewers' comments

In red: authors' reply

Anonymous Referee #2

Revision comments to the paper: Mangrove Forest against Dyke-break induced Tsunami in Rapidly Subsiding Coasts. H. Takagi, T. Mikami, D. Fujii1, M. Esteban

The paper is well written and documented, but there are a few misspellings

Page	Line	Comment
2	5	Correct abstraction by extraction
2	23	Correct dyke by dykes
3	26	Correct m/s by m3/s
6	1	Correct Losada by Losada et al.
6	9	Change "resembling which resembles" by "like"
9	21	Reference Kaneko S., Toyota T. is not commented in the text
10	12	Reference Reed D.J. is not commented in the text

We thank the reviewer for a number of very productive comments and suggestions, which would enable us to significantly improve our manuscript. All of the comments above will be modified accordingly.

Figure 7 showing the models bathymetry indicate a steady topography descent from the upper part of the domain (where the dyke breach is located) to the opposite side. Despite the poor selection of colours it can be seem that the roads around the breach are at around -1.5 m, while point 7 and beyond in the other side of the domain is about -3 m or more. This is not congruent with the much complex measured topography Printer-friendly version Discussion paper indicated in figure 3.

As the reviewer points out, the lower half of the plots indicated in Fig. 3 (c) shows a ring road which is relatively higher (-1.0 – -1.5 m) than the lowest part of the town (-2.5 – -3.0 m). However, the authors came to realize that the road was higher than surrounding areas. There were some corners where the ground measurement was not possible because of the difficulties in access to the area due to the presence of an off-limits area or informal settlement (please see the photo below). Instead of using the elevation along the road, the elevation of the lower half of the domain was conservatively assumed to be the same as the lowest part of the town in the numerical model. The details on this treatment will be described in the revised manuscript.

The velocity figures for the present scenario without mangrove protection and in all cases with it show that by the simulation end (20 minutes) water is flowing at steady pace in all points. As water depth is also stabilised, where is the water flowing? There are open boundaries? There is insufficient data on the paper about the boundaries of the numerical domain, so results are of difficult interpretation based on the presented information.
A better figure 7, showing clearly the model boundaries and the topography will be welcomed.

Since the simulation runs for only the beginning of 20 minutes after the breach, sea water passes through the community and accumulates in a lower part of the computational domain, making it possible to avoid imposing pseudo-open boundaries on the land. In the revised manuscript, the details will be carefully clarified.

The wild oscillations of water level and velocity shown in the case of 2 m subsidence case without mangrove protection are not commented. Could it be related to model instabilities?

We agree. The choppy flood state in the case of 2m subsidence scenario will also be described in the revised manuscript.

In relation to the capacity of people to withstand a water flow of a given depth and velocity, the proposition of Wright et al. (2010) of a depth-velocity product of 1.0 m^2/s as the safe limit for pedestrians seems optimistic. On that respect, Jonkman, S.N. and Penning-Rowsell, E. (2008) proposed some formulas for both moment and sliding instability of pedestrians, depending on the individual mass, friction factor and flow depth and velocity. Using these formulas, this 1 m^2/s limit seems only valid for trained adults. A more recent paper of Cox et al. (2010) provides a much more realistic table about the safe limits for wadding in water flows for people.

In the next revision, we will also introduce reference to Cox et al. (2010) in a way such that:

"Wright et al. (2010) proposes a depth-velocity product of 1.0m^2/s as the safe limit for pedestrians. *However, a plot of the relationship between human's instability and flow regime appears to be scattered by multiple factors such as surface material; subject actions -either standing or moving-, experience and training, clothing and footwear and physical attributes including muscular development and/or other disabilities; the definition of stability limit (i.e. feeling unsafe or complete loss of footing). Thus, the depth-velocity product criteria suggested by Wright et al. (2010) could become optimistic for some adverse conditions. Regarding physical differences between adult and child, Cox et al. (2010) suggests that for children with a height and mass product of between 25 and 50, low hazard exists for flow values of the depth-velocity product < 0.4 m^2/s, with a maximum flow depth of 0.5 m regardless of velocity and a maximum velocity of 3.0 m^2/s at shallow depths (D < 0.2 m).*"

We will also quote the paper of Jonkman and Penning-Rowsell (2008), which emphasizes that friction instability appears to occur earlier than moment instability (toppling) for the combination of shallow depth and high velocities.

Jonkman, S.N., Penning-Rowsell, E., 2008. Human instability in flood flows. J. Am. Water Resour. Assoc. 44 (4), 1–11.