nhess-2021-343:
Tsunami hazard in Lombok & Bali, Indonesia, due to the Flores backarc thrust

The manuscript studies potential tsunami hazards in Indonesia for the east coast of Mataram (Lombok) and west coast of Denpasar (Bali). Authors apply a simple deterministic tsunami modelling to assess the tsunami hazards for those two study areas. Even tough simple, the authors utilised the most up-to-date tectonic knowledge from this region. Therefore, I see that this manuscript would provide new knowledge of tsunami hazards for this region.
The manuscript also provides short but complete summary on the regional tectonic setting, seismicity, and historical events from the past. Moreover, the authors provide a much more than adequate detail on how they build or set-up the tsunami model until they analyse the results and draw conclusion. I see that this manuscript potentially also acts as a guideline for other researchers.
In general, I recommend this manuscript to be published at NHESS after some clarification as follow:

Thank you for your comments and suggestions. Please see below the list of our responses.

Further clarification:

- [Section 2.1 Faul model setup] Authors fixed the dip angle of its fault plane model to 25°, based on the study by Lythgoe et al. (2021). Whereas it is written "26±8°" in Section 1.2 Seimicity of the Flores Thrust and there is some degree of uncertainty from the study by Lythgoe et al. (2021). Could you please qualitatively analyse what will be the impact for the tsunami model?

  Thank you for your comments. We conducted a sensitivity analysis, and determined that 18° and 34° fault dips, representing the minimum and the maximum limits of the fault dip uncertainty, have minimal impact on the tsunami model: the tsunami energies of these two models are only 5-8% different from the energy of our model with a 25° fault dip. We will add a statement about this range in the manuscript.

- [Section 2.4 Tsunami modelling using COMCOT]
  - Second paragraph, it needs many reads to understand how the authors set up the nested grid. Please clarify it. Adding the resolution on Fig 6 would help.
    We will rephrase this paragraph to improve readability. We will also add the resolution of each grid layer in the caption of Fig. 6.

  - It seems that the largest domain model (L1) does not cover all the initial sea surface deformation used. Further the L5 layer is very close to the SW corner of the boundary model leaving only a few km distance from the edge. Even though the model works fine, it is uncommon to set the targeted area (L5) like in this manuscript. The wave might be affected by the boundary domain model. Moreover, peninsula of southern west part of Lombok (about 20-30 km south of Mataram) is not fully covered by the largest domain model. It might affect on how the tsunami wave propagate from the source to the target area. I recommend to enlarge the most-outer domain model (L1) so that can fully cover the initial sea surface deformation model and to show the result outside the targeted area. Some readers might interest to see the result, for example, for all Bali and Lombok coastline.

We will re-run our tsunami models so that the first grid layer has a wider coverage to include the entire islands of Bali and Lombok; this will ensure that its boundary is further away from the sublayers. We will update the frame of Fig 1b to reflect the boundary of grid layer 1. In the supplementary material, we will also update the tsunami animation so that the entire Bali and Lombok islands are shown. This is for the readers that are interested to know more about the tsunami impact outside the Lombok Strait.

[Section 3.3 Inundation in Mataram] A digital surface model is used from modelling the tsunami. Could you please qualitatively analyse what will be the impact if a digital terrain model is used?

A study by Muhari et al. (2011) compared the inundation in Mataram city using 5m-resolution DTM and modified DSM datasets. They showed that using a DTM (with constant manning coefficient) results in a wider inundation extent compared to a modified DSM (heights of the structures are extracted from the DSM and added to the DTM). In satellite images, Mataram city has a lot of closely packed structures; we therefore prefer the use of a digital surface model in our inundation modelling. Unlike in Muhari et al. (2011), we did not modify our DSM because it has higher resolution (1.5m) and hence, the structures are already well defined.

Suggestions:

- I recommend to assign a 'name' for each scenarios so that it would be easier to read the manuscript. For example, Fault Model A with 1 m slip = A-1; Model A with 3 m slip = A-3; etc. Then use these in the text.
  Thank you for this suggestion. We will update the text to adopt this naming convention.

- Line 395, please refer "headlands at 8.38°s" to a figure.
  We will add figure references at lines 395 (Fig. 7) and 411 (Fig. 8).

- Table 1. Please provide full parameters of these scenarios so that can be reproduced by other researchers. Parameters required such as: fault plane coordinate (centroid or a coordinate of one corner, depth), fault mechanism (strike, dip, rake).
  We will add the fault parameters in table 1.

- Figure 1. Please provide one (or two) reference(s) for the white squares.
  We will add the citations from lines 114 & 115 into the caption of Figure 1.

- Figure 9 caption, please remind reader that these are results from L4.
  We will add a sentence to explain this in the caption of figure 9.

- Figure 11. Please add a vertical line to indicate the estimated time arrival.
  We will add a vertical line at the arrival time of the first waves as suggested.

- Figure 11 caption, “Sea surface deformation generated by ...”, do you mean sea water elevation?
  We will change the ‘sea surface deformation’ to ‘sea surface elevation.’

- Figure 12. Please use the same format as other figures on how you show the coordinate.
  We will change the format of the coordinates in Figures 12 & 13 to match the other figures.