Nat. Hazards Earth Syst. Sci. Discuss., 3, C1689–C1691, 2015
www.nat-hazards-earth-syst-sci-discuss.net/3/C1689/2015/


Natural Hazards and Earth System Sciences
Discussions



# *Interactive comment on* "Scenario based approach for multiple source Tsunami Hazard assessment for Sines, Portugal" *by* M. Wronna et al.

**Anonymous Referee #2**

Received and published: 15 September 2015

The paper evaluates the tsunami hazard in the coastal town of Sines, Portugal, by means of the scenario-based technique. The authors call it a scenario-based approach in the title and Deterministic Tsunami Hazard Assessment (DTHA) in the paper. Please name it consistently. The steps are simple. They select the most relevant seismic faults in the area (4 SWIM faults +Gloria fault), for each fault they select the Maximum Credible Earthquake (MCE) elaborated by some of the authors years ago, and then they simulate the tsunami. Indeed, since none of the faults alone is able to reproduce the great 1755 Lisbon earthquake and tsunami, they also treat a 6th case which is a combination of two SWIM faults (HSF+MPF), assuming that the two earthquakes (MCE of HSF and MCE on MPF) occur exactly at the same time and generate the tsunami. The ensuing tsunami is not the simple sum of the two individual cases in virtue of



Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

non-linear processes. In order to carry out the numerical simulations, the authors build a DEM by assembling a number of topo-bathymetric sources. Numerical modeling is done through the in-house developed code NSWING (Non-linear Shallow Water model with Nested Grids) in three different conditions of static tide. Finally the results are presented and discussed.

My comments follow.

The scenario-based technique to assess tsunami hazard can be seen as a classic one, though there is not yet an international standardized procedure. The choice of the MCEs for the various faults is crucial for the final results and should be better justified. In particular the authors should better justify why they selected the composite fault HSMPF. If the reason is that it reproduces better the Lisbon tsunami, they should give us also historical data of the 1755 inundation in Sines and surrounding area. It would also be useful to know more on the tsunami historical observations in Sines, not only for the Lisbon tsunami. Indeed all MCE, apart from the MCE of the GF, produce inundation with run-up larger than 10 m, and the HSMPF max runup exceeds 18 m. How all of this compares with observations? Do they match? Are the observations much lower than the estimated DTHA runups? Please discuss and comment.

The authors mention a PTHA study on the North-East Atlantic. Change the publication date from 2014 to 2015.

The authors use their own tsunami simulation code NSWING and make a reference to a poster presented at the AGU Fall meeting in 2014( Miranda et al., 2014). In the poster they say that NSWING is mainly based on the code COMCOT (Liu P.L.F., Woo S.B., Cho Y.S., Computer Programs for Tsunami Propagation and Inundation, 1998, Report to the National Science Foundation) that is not quoted in this manuscript. Please, give credit. NSWING is declared to treat nested grids. In the quoted poster no indication can be found on how the nested grid problem is handled numerically. Please add details.



NHESSD

3, C1689–C1691, 2015

The authors use three tides conditions. The MHHW (called Mean Higher High Water is computed as the mean of the MHW (Mean High Water) in the period 2012-2014. The same for the MLLW (Mean Lower Low Water). The authors should tell why they consider that the three-year period they use is long enough for tides to be representative of Higher and Lower stages. Further, why did they not take into account extreme values (lowest and highest) rather than mean values? And how much do extremes differ from the considered MHHW and MLLW values?

Table 2 provides the synthesis of the results in terms of the specified metrics (MFD, MWH, etc.). In which condition of tide (MHHW, MLLW, MSL)? Please, add this information.

Table 3 gives the percentage contribution of each tsunami scenario to the aggregate for the three tide stages. This information is incomplete, since the contribution can be different for the different variables (MFD, MWH, etc.). Please, specify for which parameter the percentages have been computed.

Figure 4 should show alltogether the results (MWH, MFD, MDB and MRU) for each single scenario. It seems it displays the MWH field in the sea and the MFD on land. Probably the authors should specify better what they mean exactly for these variables. My understanding is that MWH and MFD are 2-D fields, while MDB and MRU are 1-D curves. If my interpretation is correct, MDB is the line of the maximum drawback (maximum sea withdrawal) and MRU is the line of the maximum sea penetration. It is misleading to call it MRU (Maximum Run-Up). However, if the authors really mean that MRU is the maximum runup height (as it appears in Table 2), then MRU is not shown in Figure 4. Please correct the inconsistency. This comment also applies to Figure 6a and to Figure 7. Furthermore, in all these figures the colour palette on the right hand side holds not only for MHW, but also for MFD.

---

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 4663, 2015.



NHESSD

3, C1689–C1691, 2015