

## ***Interactive comment on “Reanalysis of the 1761 transatlantic tsunami” by Martin Wronna et al.***

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Review of reanalysis of the 1761 transatlantic tsunami, by Wronna et al. for NHESD

Baptista et al. (2006) carried out a detailed analysis of the 1761 earthquake and tsunami using historical records of both earthquake shaking intensity, T phases, and wave heights and travel time reports of tsunamis. The present manuscript focuses only on the tsunami evidence, using most of the evidence reported in Baptista et al. It calculated marigrams for two sources at Baptista’s preferred location with two sets of fault parameters (strikes of  $76^\circ$  and  $254.5^\circ$ , dips of  $40^\circ$  and  $70^\circ$ , and rakes of  $135^\circ$  and  $45^\circ$ , respectively). It then argues qualitatively that the travel time matches the reported tsunami travel times and that the wave amplitude fits better one of the two fault parameter sets. Unfortunately, this single test to distinguish between two sets of fault parameters is not sufficient for publication in a journal and may be better suited for a

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thesis chapter, because it does not advance our knowledge beyond Baptista's paper. In addition, the manuscript is poorly written and requires lots of clarifications.

The paper should clearly state the motivation behind this work, its novelty relative to Baptista et al. (2006). There is no need to describe in detail tsunami observations, which were already outlined by Baptista et al., or to describe each result. Instead, the paper should explain the methodology better, justify the reasons for the choices of the modeling parameters, and highlight and discuss significant results, that will advance our knowledge.

Following are detailed comments:

1. Modeled sources: Why were the specific strikes, dips, and rake for the 5 sources in Table 2 chosen, and why not other fault parameters? Why are only 2 of the 5 sources listed in Table 2 discussed and not the others?
2. Can you provide a more quantitative/statistical measure why you prefer one of the sources over the other (or over the other hypotheses which were not presented?)
3. Hyp. A-MS: How are the 4 segments of the first source arranged? Adjacent to each other or spaced or oriented at different strikes? What is the slip on each segment?
4. Did you consider modeling marigrams in locations which did not report a tsunami (e.g., the U.S. East Coast, other Caribbean sites) to test whether the rupture parameters produce insignificant marigrams there?
5. Were there any observations from Morocco?
6. Wave height: Please define wave height, maximum peak, etc. Do these terms only represent the positive part above a nominal Mean Sea level? Why don't the numbers listed in the text often match the marigrams in Figures 5 and 7 (e.g., section 5.1-Cadiz 1.8 m in text, 2.3 in marigram; section 5.2 – Kinsale >1.5 in text, <0.8 m in marigram; Terceira >5.5 m in text, 2.4 m in marigram)? The max. wave height in Table 4 does not match the marigrams for Scilly and Mount's Bay, Kinsale, Azores, and Barbados. Are some of the values read from the maps and not from the marigrams?
7. Observations relative to the tidal cycle: The only location where the total tidal range and time relative to the tidal cycle were considered was Lisbon. What about the other locations? How did the second and third

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waves arriving at different times in the tidal cycle, match the observations? 8. The Barbados marigrams show a much higher wave height 1.5-2 hours after the first wave arrival, or 9 hours after the event. Which wave arrival would have been noticed by eye witnesses? 9. At what water depths were the marigrams calculated? Did they take into account harbor reverberations, which affect the observed wave periodicity? How did the nested grids work if the original grid from which the bathymetry was derived, was much coarser?

Text, figures, other suggestions

1. Table 1 showing the observations is almost unreadable. I had difficulty matching locations with the other columns. Also, the locations need geographical coordinates.
2. Figures 2, 3 and the inset of Figure 1 can be combined to one figure. In this figure, please mark the locations of the Ampere and Coral Patch Seamounts and Horseshoe Abyssal Plain and list in the figure caption all the abbreviations that appear on the figure.
3. There are newer determinations of the relative plate motion along the boundary (Nocquet and Calais, 2004; Fernandes et al., 2007). Please mark the convergence vector from plate kinematics on your tested fault strikes.
4. Give a brief explanation of Mansinha and Smiley equations. Tsunami models typically use the Okada equations.
5. Were the time zone in Portugal, Portuguese Islands, the U.K. and Barbados similar to those today? Did every location measure their time independently relative to the sun's angle in the sky (i.e., latitudinal)? How well could minutes be measured in 1761?
6. Section 3 -There is no need to provide a verbal description of all the observations. They appear in Table 1 and Baptista et al. (2006).
7. There is no need to describe all the results of the synthetic tests in the text (p. 8-13). We can read them from the graphs. Describe only the most important points that you want the reader to pay attention to.
8. The reader is lost in the current discussion, which mixes lots of facts listed in a location by location list.
9. The final conclusion points are poorly written and confusing: What are "the area where there are the largest compressive structures"? Why is the timing of Barbados an important conclusion when the paper does not search for the best source location? Where was the 14 m wave height calculated? It was not mentioned earlier.
10. Blaser et al. not

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Blazer. Withdrawal (noun) not withdraw.

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