

## ***Interactive comment on “Reconstruction of past marine submersion events (storms and tsunamis) on the North Atlantic coast of Morocco” by Otmane Khalfaoui et al.***

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Dear colleagues,

The sediment core that is presented in your paper represents the most complete sequence of marine submersion events ever found on the coasts of Morocco, including a good candidate for the famous 1755 tsunami. However, the paper has several major weaknesses and I regret to recommend its rejection. As it stands, the paper is rather a preliminary report on one single core, and more investigation is required before this study could be accepted for publication.

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The title itself does not reflect exactly the content of the paper, as the distinction between storm and tsunami beds is not discussed in the paper. The potential storm deposits are not (or very-poorly) described.

In the introduction, more references are needed (see also my comment below). Previous references on marine submersion events on the coasts of Morocco are cited, but it would be good to add a short paragraph summarising the main conclusions of these papers.

I was surprised that only one core (TAH17-1) is presented, although at least one other core (TAH17-4, mentioned at line 20 page 7) was retrieved. Presenting other cores would allow evaluating the reproducibility of the results obtained for TAH17-1, together with giving information on the longitudinal/lateral continuity of the sedimentary units observed. Indeed, many tsunami deposits are characterised by longitudinal trends such as landward fining and thinning. Making conclusions from one core only is a strong limitation.

Methods: the geochemical analysis is based on data provided by a hand-held XRF device. The reliability of such equipment is questionable. As a first approach it gives a good idea of the composition of the sediment, but why not using a  $\mu$ -XRF lab device since you have good cores?

Why merging results and discussion in section 4? Sections 4.1 and 4.2. are clearly "result" parts. Discussion really starts at page 7 (section 4.3). Please consider re-organising the manuscript so as to separate results and discussion.

Description of the lithostratigraphy is too short and should include a description of the grain size distribution of individual subunits, and vertical trends of grain size.

On figure 2, there's a sedimentary gap at depth 90-120 cm. It is thus difficult to have a good idea of the characteristics of unit B, which is a key unit, probably related to the 1755 tsunami. Is it due to sand percolation during core retrieval? In that case why not

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trying other cores? Why not trenching in order to access to this important unit? It's another severe limitation for the conclusions that are proposed.

At the beginning of page 5, unit B is compared to other 1755 tsunami deposits in Portugal. This comparison could be enlarged to many other tsunami deposits in the world (i.e. marine sand beds as discontinuities in finer sediments), but the sedimentary setting in Portugal and Morocco is certainly different, so more arguments are needed.

The XRF profiles seen on figure 4 should be described in more details (actually the section presenting these results is only 5-lines long).

At page 9 (correlation of events with historical archives), we lack a discussion on the magnitude/intensity of the 1755 tsunami on the Moroccan coast. There's indeed a great debate on the impact of this event and the Moroccan piece of the puzzle is particularly important for deciphering between the different rupture scenarios that are proposed in the literature (see papers by MA Baptista, PL Blanc, etc). The tsunami evidence at 1 km from the shoreline provided by your new data is a key observations, but it is (too) briefly presented and discussed, and so under-exploited.

In the description of the core, you distinguished E13 and E14 subunits, but suddenly in the discussion these 2 subunits become a single tsunami deposit because it fits better with ages! A better description of the E13/E14 section of the core is required before concluding if it's one or 2 different events.

By the way, English should be revised by a native.

References:

More references in the introduction would be welcome (e.g. at lines 23, 27, 34, 36). Please avoid auto-citation when you cite a single paper illustrating a large topic (e.g. at line 23: Chaumillon et al. 2017 deals with storms only, although it's an excellent review).

Minor comments:

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p1-l33: not sure if a tsunami from Alboran Sea would impact the Atlantic coast of Morocco. p1-l34: plunging (not diving). p1-l36-38: the Cumbre Vieja case viewed from Ward & Day (2001) is highly controversial. Please add other references on this low-probability / high-magnitude scenario (e.g. Abadie et al., 2012). p2-l3: "This approach has been used on the Portuguese and Spanish coasts, especially to track past tsunamis." p4-l36: I don't understand why unit B is 20 cm thick between 140 and 85 cm depth... p5-l1-2: this sentence should be moved to discussion. p5-l9-12: this section belongs to "methods". p5-l20: silica (rather than silicone). p7: it would be good to remind the depth range of subunits E1, E13 and E14 in the text. p7-l15: I'm not familiar with the use of such extrapolated ages, but is it really correct to present such an averaged date from two different techniques? p7-l23: The reservoir effect is not the only possible explanation for the difference observed between C-14 age on shell and wood. Where does they both come from in such a sedimentary setting? no transport prior to their present-day position? p10-l13: I would not write "high-resolution". High-resolution studies rely on other techniques such as  $\mu$ -XRF, CT-scan, etc.

Figures:

Figures 4 and 5 could be merged together. Place subunits E1, E13 and E14 on figures 2 and 4.

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