

Interactive comment on “Update of the tsunami catalogue of New Caledonia using a decision table based on seismic data and maregraphic records” by J. Roger et al.

Anonymous Referee #2

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This paper is an important contribution to the building of tsunami databases in areas rarely impacted by catastrophic events, but which lay close to significantly active subduction zones. The update proposed in the study is worth being published, and also shared among the scientists and general public to increase awareness.

From a scientific point of view some aspects of the paper have to be improved or clarified, some sections should be better hierarchized, thus it may be published after a minor revision is done.

The title indicates a decision table, while the text relies on an algorithm. However, the title seems more appropriate since the procedure is a conditional extraction of a

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database.

The abstract should be more precise on the dataset obtained, and should be representative of the whole content. The 1960 tsunami evidenced has to be mentioned, as well as near I.52.

In the beginning of section 2.4, it should be added that the tsunami amplitude also relies on the rupture characteristics and dynamics, not only on the geometry. Indeed tsunami earthquakes could also be foreseen (are they any documented in the regional sources?).

In section 2.4, the choice of the distance criterion should be more discussed. Does the average strike of a given subduction play a role also? If no, it should also be stated.

In section 2.5, the search procedure seems to be applied to the whole dataset, or was there any succession of conditional tests (first magnitude and depth, then distance)? In the latter case the four boxes should not be shown at the same level in the figure 2, but after each other. Later on the 6-digit accuracy after the comma does not make sense to describe the box for the barycenter estimation.

All the locations described in section 2.6 are not reported in Figure 5: Grande Terre, Loyalty, Noumea (even though Chaleix and Numbo are displayed) are missing (and subsequently referred locations such as Isle of Pines, Ponerihouen, Canala, or Mou in Lifou, as well). Here a first mention is made of the arrival azimuth (see remark above on the distance criterion), has it finally to be considered? Since some tsunamis can also be important on the lee side of islands, the azimuth is probably not the only reason, and coastal and reef conditions should be mentioned. And in addition the 1960 tsunami was finally well observed in Noumea. The paragraph should be improved to be more consistent.

Regarding the arrival azimuths from NZ or Papua New Guinea, the reader cannot easily figure out where these azimuths are on the figure. At least some arrows could be

added.

In the beginning of section 3, it is now stated that magnitudes above 6.3 are considered. This is not consistent with the work previously presented with the criterion above 6: what was the use to consider 6.0 in the previous section? The section 2.3 could be modified to add the percentage corresponding to $M_w < 6.3$. Overall the reasoning does not seem logical. Keeping from the beginning magnitude above 6.3 could have been sufficient.

The following presents the most important results, but the reading is not always easy. The section 3.1 is a mix of 1) cross checking catalogues and 2) checking tide gauge data, and finally 3) checking tide gauge data independently from the catalogues (which could actually be even the first step in the reasoning), but overall the text should be better hierarchized. Also to help the reading, two bullets could be added on lines 159 and then 164, to identify the two periods that are investigated for the 32 events remaining.

The end of section 3.1 establishes percentages for the different periods studied, but the conclusion drawn is not straightforward: what does the factor 10 increase mean? That the Sahal catalogue was not complete (but based on a different approach)? Could it be commented further?

Then the new data are presented and this a very important part, showing how tide gauge data are essential to better understand tsunami impact. Ouinne is identified as an amplifying place during the 2015 tsunami from Chile. Is the relative amplification in Chaleix compared to Numbo due to different locations from the open sea? Their detailed locations are not described.

The recent Dec. 2018 event is important also to raise awareness. This is not the core purpose of the paper, but it could be worth mentioning the min and max horizontal inundation and drawdown observed during the tsunami.

Finally the section 3.3 comes back to local observations independently from catalogues. If the tide gauge data are available for 2010 in Numbo, it could be shown, a 10 min sampling could be sufficient. In that case the use of a spectrogram could be helpful (as well for all other data, in order to also quantify the bay amplifications). The 1960 is very interesting; however the following sheet is not shown (after 16:00), thus the detiding is not very accurate and the remaining trend is probably affected by a boundary effect. By the way the theoretical tide used should be explained (or is this a filter?). If further temporal analysis is not possible, it should at least be mentioned. It would be very informative to have the whole sequence that probably lasted more than 24 h.

In the section 4, the overall Pacific setting is presented, but actually the figure 12 could even be put at the beginning of the paper when the catalogues are presented. The 2016 Papua New Guinea is reported with a depth of 100 km and a small tsunami was triggered. This poses the question of the figure where depths below 100 km are kept while the method should have rejected the corresponding event. Note that GMT Harvard put it at a 50 km depth.

The figure 13 could have been completed with a graph of tsunami heights as a function of the magnitude that can be useful for pre operational procedures. Again, the distance criterion is not the most relevant to analyze the dataset, since the orientation of the main energy spread is at least as decisive to produce a tsunami. In addition distant earthquakes with magnitude lower than 7.7 (possibly from 7.4 to 7.6) and slow ruptures (tsunami earthquakes) could also pose some risk.

The paper does not mention any paleotsunami research although the area would probably deserve some investigations, this could be mentioned.

* Some other remarks: 1.36-37: the maximum magnitude of 8.2 is for instrumental events only, and this is already for strong earthquakes. The “although” does not sound accurate. On the contrary, it could be stated that magnitudes well above 8.2 to 8.5 are

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possible in the area and most probably tsunamigenic.

I.55: the term “algorithm” could also be named a conditional test, as it is mostly the case in this paper

I.69: the box described here is not easy to figure out without a map, it may be also commented as describing the whole Pacific extension? And a 3 digit accuracy after coma is not necessary in the box.

I.98: the tsunami wavelength is essentially related to the fault width, and to the rupture dynamics. This should be added.

I.222: “more so than at” sentence to be revised?

I.232: coma to be removed before foreshocks

I.282: isle of Pins was isle of Pines elsewhere, it should be unified (and added on Figure 1)

I.325: it is mentioned that less people used to live close to the shores but the first part of the sentence refers to Sept 2009 as a turning point: has the population density that changed within 10 years? Or is it for older periods?

* Figures:

Figure 1: the label “inactive subduction zone” does not seem to be associated with any structure of the figure, so is it useful? If it is the case, it should be made clearer (maybe it is hidden beneath some earthquakes?). Also the legend could also describe the color scale. Convergence rates could also be added.

Figure 2: two lines $M_w = 6$ (or 6.3?) and depth = 100 could be highlighted to delimit the dataset finally used (or rejected). And the legend could describe the procedure applied as a filter. Otherwise the figure itself does not provide any message.

Figure 4: see the comment above.

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Figure 5: the names of the location should be enlarged, and at least two locations described in the text are missing: Ile des Pins, as well as Yate (see also comments above).

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