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## **Comment on nhess-2022-157**

Anonymous Referee #1

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Referee comment on "Potential tsunami hazard of the southern Vanuatu subduction zone: tectonics, case study of the Matthew Island tsunami of 10 February 2021 and implication in regional hazard assessment" by Jean Roger et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2022-157-RC1>, 2022

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The results of the proposed paper by Jean Roger & al; on the case study of the Matthew Island tsunami of 10 February 2021 are relevant to be considered to assess the potential tsunami hazard of the southern Vanuatu subduction zone.

The objectives of this paper are clear and reached. Nevertheless to assess the level of the potential tsunami hazard, as indicated in the title of the paper, some modifications should be considered by the authors.

The two main parameters considered in the tsunami threat and hazard are the estimated arrival time of tsunami waves after the earthquake and the level of threat, directly related to the tsunami height value observed or computed along the coastline, in particular at sea level station location.

In this paper, several specific material are describing the tsunami threat in particular : figure 4 : tide gauge and DART records, table 2 arrival time and amplitudes ; Figure 11 and 12 Maximum tsunami height.

Several modifications would be needed to help to improve those figures, modifications that will be considered separately (next chapter minor revisions and modifications).

Considering the tsunami hazard , it is internationally well known that several thresholds are considered in tsunami hazard assessment and warning system : 30 cm for the first level of threat, 1m for the second , 3 m for the third...

In table 2, it should be noticed that the maximum tsunami amplitude recorded is higher than 28 cm at 8 locations, and higher than 1 m at one location (Lena).

The authors should highlight that this M 7,7 quake in that region resulted with a tsunami threat that need people evacuation for at least Height different sites, and probably many more (without tide gage records), considering the maximum amplitude modeled at Figure 11.

On Figure 11 at each tide gage the maximum tsunami height records should be indicated on the map, circle with the scale color considering the value of maximum amplitude.

#### **Minor revisions and modifications :**

L37 missing : tsunami height records of Mw 7,7 highlight that 30 cm tsunami waves amplitude were recorded at height different tide gages , included one raising more than 1m. The tsunami threat of that event should be considered for evacuation of the shoreline (coastal marine threat) at those locations.

L43 add : **tsunami hazard, sea level records**

Figure 1 : add one major seismic and tsunami event - yellow star - Mw 7.0 : 19-11-2017

L146 ... and **7.0**..

L198 which is generally **more accurate** ...

After P 9 Line number is missing !

P10 : which is **1.6** smaller than those calculated

P14 : Figure 4 : the blue line of the signal should be blue dark

Several stations records have disturbances, in particular LIFO, LENA, GBIT, probably not related to tsunami waves

What is the origin of these sea level disturbances ?

P16 : Table 2 :

- how tsunami wave amplitude is measured ? Tide filtering, 0- crest; .....

- for the stations LIFO, LENA, GBIT, due to the sea level disturbances, how did you measure the tsunami amplitude ?

In particular at LENA, the behavior of the record (higher than the tide) would provide doubt about the accuracy of the tsunami amplitude measurement of the record.

P21 three scenarios first wave at too early... other it is too late. Authors should specify how early or late it is ( a few minutes... more ?) Are those delays negligible or not. Please specify.

P23 Figure 9 the quality of the line of the records should be improved

P28 Figure 11 : at each tide gage, change the white color of the circle with the color corresponding to the maximum of the tsunami measured at the specific tide gage (maximum amplitude color scale).

Change the color scale of the maximum amplitude : the current color scale is green from 5 cm to 25 cm. This scale color is not helping to visualize where and how the tsunami height is growing from 5 to 25 cm : the largest surface of the sea.

P29 Figure 12 same remark as figure 11 regarding the maximum amplitude scaling color.

P32 Contribution to regional tsunami hazard assessment

The comments and proposed modification made above on the threat level should be added in that chapter.

P33 The results of the tsunami hazard assessment of the 8.2 scenario should be added, and in particular that such earthquake would generate tsunami waves height at shoreline higher than 1 m in many places at New Caledonia, Vanuatu, Fiji, New-Zealand, ...

P34 L 112 : and **wrote** the...