Referee comments are in black Calibri.

The paragraphs of the document in question will be in black Calibri.

Our replies to reviewers are comments in blue and italics.

Paragraphs that are part of the document will be written in blue, indented and new text highlighted in yellow.

REFEREE 1

Comment of the Referee 1 on line 30: Please review: 'WANG and LIU'. Suggested: 'Wang and Liu'.

Response to comment:

Thank you for pointing this out. This has been corrected in the revised manuscript (line 30):

> Some of the most recent examples of devastating earthquake-generated tsunamis include the 2004 Indian Ocean tsunami (Synolakis and Bernard, 2006; Wang and Liu, 2007; Satake, 2014)

Comment of the Referee 1 on line 38: I suggest 'are not always included' instead of 'are not included'. Sometimes they are included (Mw and focal Depth are usually included).

Response to comment:

We thank the reviewer for pointing this out. The manuscript has been revised accordingly (line 38):

> These parameters —such as magnitude (M_w), focal depth, and distance to the coast— are not always included in public warning messages, but are used as part of the decision-making process

Comment of the Referee 1 on line *45:*

- IGN also uses ETA for their tsunami alerts (Section 2.2.2 in IGN, 2021). ETA appear in all IGN tsunami alerts.
  Response to comment:

  We appreciate this comment. The text has been added in the table (Table 1):

  > Focal depth/ M_w / Coastal distance/ ETA

- Roudil et al., 2013 does not appear in References section.
  Response to comment:

  Thank you for pointing this out. Added in the references section (Table 1):

  > Roudil, P., Schindelé, F., Bossu, R., Alabrune, N., Arnoul, P., Duperray, P., Gailler, A., Guilbert, J., Hébert, H., and Loevenbruck, A.: Science of Tsunami Hazards Journal of Tsunami Society International Volume 32 Number 1 2013 The French Tsunami Warning Center for the Mediterranean and Northeast Atlantic: CENALT, 32, 1, 2013.

- Should not be 'JMA, 2025' the reference for Japan?

  Response to comment:

  We thank the reviewer for pointing this out. The reference has been corrected accordingly (Table 1).

  (Japan Meteorological Agency, 2025)

- Is 'U.S. Indian Ocean Tsunami Warning System, 2007' the correct reference for Chile? It does not appear in Reference section.

  Response to comment:

  We agree with the reviewer. The reference has been corrected accordingly (Table 1):

  (Servicio Hidrográfico y Oceanográfico de la Armada de Chile, 2023)

Comment of the Referee 1 on line 74: Please review: 'to label an event as a tsunami'. Suggested: 'to label an event as tsunamigenic'.

Response to comment:

We thank the reviewer for pointing this out. The manuscript has been revised accordingly (line 75):

[…] defining a consistent criterion to label an event as tsunamigenic and, therefore, trigger an alert—particularly for small disturbances, where impacts are less evident.

Comment of the Referee 1 on line *83:* *'Reuters, 2016' appears in References section as 'Reuters, 2017'.*

Response to comment:

The full reference is this one (line 84):

Reuters: Chilean court accepts settlement in failed tsunami warning case, 2016.

Comment of the Referee 1 on line 120: *Please review: 'to Sect. 2.1-2.6'. Suggested: 'to Sect. 2.2-2.6'.*

Response to comment:

We acknowledge this oversight and have corrected it. The manuscript has been revised accordingly (line 121):

The numbered blocks in Fig. 1 correspond to Sect. 2.2–2.6

Comment of the Referee 1 on line 133*:* *Please review: 'to Sect. 2.1-2.6'. Suggested: 'to Sect. 2.2-2.6'.*

Response to comment:

We thank the reviewer for pointing this out. The text has been corrected accordingly (line 134):

> The numbering of the boxes corresponds to the subsections in Sect. 2 (2.2–2.6), where each step is described in detail.

Comment of the Referee 1 on line 138:

Please review: 'tsunamis catalogue'. Suggested: 'tsunami catalogue'.

Response to comment:

We appreciate this comment. This has been corrected in the revised version (line 139):

> The NOAA tsunami catalogue provides a comprehensive

- *NOAA tsunami catalogue should be cited as: 'National Geophysical Data Center / World Data Service: NCEI/WDS Global Historical Tsunami Database. NOAA National Centers for Environmental Information. doi:10.7289/V5PN93H7 [access date]'*

Response to comment:

We thank the reviewer for pointing this out. This has been corrected in the revised version (line 139):

> National Geophysical Data Center / World Data Service: NCEI/WDS Global Historical Tsunami Database. NOAA National Centers for Environmental Information. doi:10.7289/V5PN93H7 [accessed: 12 Dec 2024]

Comment of the Referee 1 on line *139*: *Please review: '2000 BC'. Suggested: '2100 BC'.*

Response to comment:

Thank you for pointing this out. The manuscript has been revised accordingly (line 140):

> The NOAA tsunami catalogue (National Geophysical Data Center / World Data Service, 2024) provides a comprehensive listing of historical tsunami source events and wave run-ups worldwide, extending back to 2100 BC

Comment of the Referee 1 on line 145: *Please review: 'of which 424 seismic origin events'. Suggested: 'of which 424 events of seismic origin'.*

Response to comment:

We thank the reviewer for pointing this out. The text has been corrected accordingly (line 146):

> The period considered in this study, from 1976 to 2023, includes 601 recorded tsunamis, of which 424 events of seismic origin were selected…

Comment of the Referee 1 on line 151: *Could you elaborate on the most common reasons why the remaining 47 tsunamis, with a probable or definite M>=6 seismic origin, are not associated with the USGS earthquake catalogue? I would have expected to match all 424 records with the USGS catalogue.*

Response to comment:

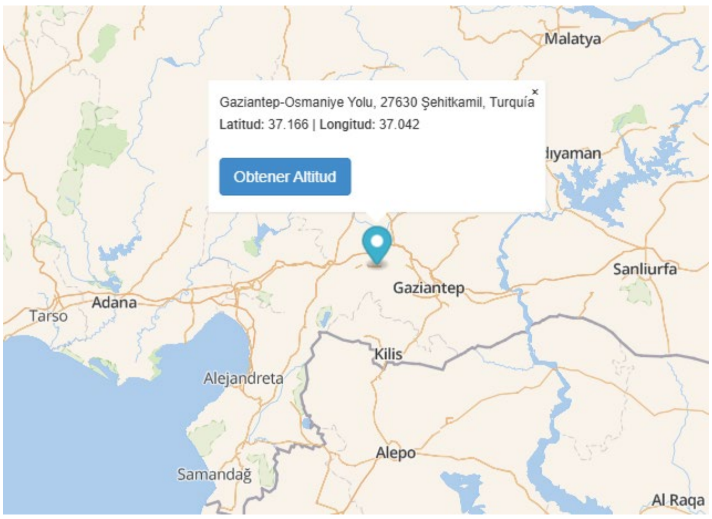
The authors thank the reviewer for this comment. The initial number of tsunami events satisfying the time interval (1976–2023) and seismic origin with Mw≥6 was 423. Events classified as Very Doubtful Tsunamis and Questionable Tsunamis (Validity code defined by NOAA) were removed resulting in 397 events.

Finally, after applying the spatial (±3°) and temporal (±24 h) matching criteria between the NOAA tsunami catalogue and the USGS earthquake catalogue, 377 events were successfully associated with earthquakes in the USGS database.

The remaining unmatched events are mainly related to limitations in the available source information or differences between catalogues. The most common cases include:

- *Earthquakes whose epicentres are located inland, so that the simplified rectangular rupture model used in this study does not intersect the ocean surface and therefore cannot generate a simulated tsunami.*

Example: NOAA Tsunami: 6/2/2023 Turkey



- *Events for which the necessary tectonic or focal-mechanism parameters required to compute the Okada source model are not available in the USGS database.*
  Example:

https://earthquake.usgs.gov/earthquakes/eventpage/usp0001sa1/executive

To clarify this mis-match we have rewritten this paragraph in the revised manuscript (line 146-153):

> The period considered in this study, from 1976 to 2023, includes 601 recorded tsunamis, of which 424 events of seismic origin with magnitudes ≥ 6 were selected, while events caused but landslides or volcanic activity were excluded. Tsunamis classified in the catalogue as doubtful or very doubtful were also excluded, resulting in a total of 397 events. Subsequently, NOAA events were matched with USGS earthquake data to ensure consistency in time and location when comparing both catalogues. A spatial buffer of 3° in epicentre's coordinates and a temporal buffer of ± 24 hours from the earthquake origin time were applied to account for potential discrepancies between datasets. After applying these filters, 377 NOAA events were retained for simulations, assuming they correspond to the same earthquakes based on the defined buffers. This catalogue provides the historical reference against which the simulation-based threshold was validated.

Comment of the Referee 1 on line 170: *Please unify the notation in the whole text by using either 'Fig.' as in line 119 or 'Figure' as in line 170.*

Response to comment:

We appreciate the reviewer's comment. The manuscript has been revised accordingly (line 170):

> (119) The numbered blocks in Fig. 1 correspond
>
> (170) nodal planes, and principal axes allowing for precise computation of seismic parameters and fault slip (Fig. 2)

Comment of the Referee 1 on line 171: *I do not understand the comments regarding the absence of M_0 in the early years of the GCMT catalogue. M_0 is part of the CMT solution, and it is available in https://www.globalcmt.org/CMTsearch.html for all records starting at 1976. Moreover, since Mw is computed directly from M_0, using Kanamori (1977) relation, I do not see practical di erence between using M_0 or M_W to characterise seismic events, as they provide the same information.*

Response to comment:

We agree with the reviewer and acknowledge the confusion in the manuscript.

Although the moment tensor data was available in the GlobalCMT catalogue for events since 1976 (Harvard CMT then), the data incorporated to the USGS database only reflected the orientation of the nodal planes of the double-couple and the earthquake magnitude for events between 1976 and 1989. See for example the Borah Peak Earthquake of 1983: https://earthquake.usgs.gov/earthquakes/eventpage/usp0001zbv/focal-mechanism

As Tsusy incorporates the data from the USGS database due to practical reasons, our working catalogue inherits its limitations. Nevertheless, as the reviewer mentions, using the Kanamori relation to obtain the Mo from the M_W is practically the same.

We have reworded that section (line 162-170):

> From 1976 to 1989, events were described using focal-mechanism data originally in the GCMT catalogue (Global Centroid Moment Tensor) (Dziewonski et al., 1981; Ekström et al., 2012). Although the full moment tensor was available from the original source, the data incorporated in the USGS catalogue includes only the orientation of the nodal planes and rake of slip, but do not include the seismic moment (Mo) or the tensor components. In these events the scalar moment has been computed from the magnitude using the Kanamori (1977) equation.
>
> Between 1990 and 1997, the data included in the USGS catalogue incorporated both nodal planes and moment tensors, the latter providing Mo directly for slip calculations.
>
> The final period, spanning from 1997 to 2023, encompasses the most comprehensive information available for each event, including the W-phase Moment Tensor (M_{WW}), nodal planes, and principal axes (Fig. 2).

Comment of the Referee 1 on line 188*: Please review: 'focal mechanisms data and (2) moment tensors data'. Suggested: 'focal-mechanism data and (2) moment-tensor data'.*

Response to comment:

We thank the reviewer for pointing this out. The text has been corrected accordingly (line 184-185):

> As mentioned, USGS database consists of two types of data: focal-mechanism data and (2) moment-tensor data

Comment of the Referee 1 on line 196*: Please indicate in the strike-slip ruptures which is the criterion used in this study to select the nodal plane as the rupture plane. Has it been selected manually considered the geology of the area where it has occurred?*

Response to comment:

In the case of strike-slip ruptures, as the running of the code needs to be automatic, there is no chance to select manually the most appropriate nodal plane from the geological characteristics of the epicentral zone. In these cases, the nodal plane with the greatest dip is the used as it should be the most compatible mechanically.

Comment of the Referee 1 on line 198*: Please explain the effects of selecting the wrong nodal plane.*

Response to comment:

We added details for the previous two comments of the reviewer on lines (193-198):

> In the case of strike-slip ruptures, with near-vertical nodal planes, there is no physical criterion that can be used a priori without knowing the geology of the area where it has occurred. The algorithm chooses the nodal plane with the greatest dip, but the selected nodal plane does not necessarily correspond to the earthquake rupture plane. The vertical deformation in strike slip events tend to be located at the tips of the rupture plane; consequently, although the amount of vertical deformation is limited for this kind of ruptures, sensible differences between the tsunamis generated by both nodal planes can arise, specially in the near field.

Comment of the Referee 1 on line 221-224*: I do not follow this reasoning. Why 'location and depth parameters were adjusted to ensure the entire source remained on land'? There are well-known cases of shallow earthquakes with onshore epicenters that generated tsunamis. In my view all o shore epicentres must be considered, as well as onshore epicentres whose simplified rectangular rupture surfaces extend o shore.*

Response to comment:

We acknowledge that the wording of the paragraph may be confusing. We have reworded it to better explain the idea (line 219-223):

> Following a conservative approach, an event was classified as a potential tsunamigenic source if any part of this rectangle intersects with the sea. In shallow events the simplified rectangular geometry obtained from the dimensions of the empirical relations may extend part of the rupture above the earth surface taking into account the original hipocentral depth. In such cases, the depth parameters were adjusted to ensure the entire source remained into the crust.

Comment of the Referee 1 on line 254-255: *This sentence is confusing for me. Why are only simulations of the historical tsunami events (377 events) mentioned? In line 269, it is clearly stated that simulations were conducted for the 5,315 seismic events described in section 2.3.*

Response to comment:

The authors thank the reviewer for pointing out this ambiguity. The reference to the section was incorrect in the original manuscript. The simulations were performed for the complete set of 5,315 seismic events described in Sect. 2.3, while the subset of 377 events corresponds to earthquakes matched with the NOAA tsunami catalogue and is used for validation purposes. The manuscript has been revised to clarify this distinction (line 252-254):

> The process begins with the selection of seismic sources as input data, which is crucial for accurately predicting tsunami generation and propagation. The seismic events included in the dataset described in Sect. 2. 3 have been used to simulate all historical tsunami events.

Comment of the Referee 1 on line 292: *TSUSY Database does not have a hyperlink in the footnote.*

Response to comment:

The authors thank the reviewer for noting this issue. The link has now been corrected (line 292) and is fully functional:

> Accessible at: IH-TSUSY Tsunamis&Earthquake Data

Comment of the Referee 1 on line 298-299: *I do not fully agree with the statement that 'Operational tsunami warning systems ultimately require a binary decision: for a given earthquake, should the event be considered as tsunamigenic or not'. In practice, a TWS must determine, for each monitored coastal segment, whether that specific area is going to be impacted by a tsunami or not.*

Response to comment:

We agree with the reviewer that operational tsunami warning systems ultimately assess tsunami impact at specific coastal segments rather than making a purely global binary decision. In this study, the binary classification refers to the tsunamigenic potential of the earthquake source itself, which constitutes a preliminary step before local impact assessments. This first-level classification allows the system to rapidly decide whether a full tsunami simulation should be launched, which is computationally more demanding. The manuscript has been revised to clarify this distinction (line 298-300):

> Although operational tsunami warning systems ultimately evaluate tsunami impact at specific coastal segments, an initial step is to determine whether the earthquake source is capable of generating a tsunami. In this study, this first-level decision is represented as a binary classification of the earthquake as tsunamigenic or non-tsunamigenic.

Comment of the Referee 1 on line 369-413*: I consider these lines dispensable, as Figure 7 is self-explanatory. The summary provided in lines 414-417 should be sufficient.*

Response to comment:

Although we partially agree with the reviewer, and figure 7 could be considered self-explanatory, we believe that the main characteristics of the different distributions should be mentioned. If the length of the article were to be reduced, it would be understandable that we would be asked to revise it.

Comment of the Referee 1 on line 452*:* *Please review: 'within the analysed historical dataset'. Suggested: 'within the analysed dataset of simulations'.*

Response to comment:

We thank the reviewer for pointing this out. The text has been corrected accordingly (line 481):

> suggesting that wave heights exceeding 2 m are extremely rare within the analysed dataset of simulations.

Comment of the Referee 1 on line 487: *The choice of threshold values of 0.1 m and 0.4 m appear somewhat arbitrary. A quantitative justification would strengthen the rationale for adopting these particular values.*

Response to comment:

We thank the reviewer for this comment. In the revised manuscript, the methodology used to determine the tsunami-occurrence threshold has been substantially updated following the reviewer's suggestion. Instead of relying on a predefined intermediate range to derive the threshold, we now perform a quantitative evaluation of candidate thresholds by comparing the simulated classifications with the tsunami records reported in the NOAA catalogue.

The manuscript has been revised accordingly (Sect. 2.6 (line 342-377) *and 3.3* (line 518-545)*):*

> Section 2.6: Threshold optimisation procedure
>
> Once the tsunami indicator based on the 99.98th percentile of the MWH was defined for each simulated event, the next step was to determine the optimal threshold separating tsunami and non-tsunami cases.
>
> To assess the performance of alternative thresholds, the simulated events were compared with the tsunami records reported in the NOAA catalogue, which was used as an observational reference dataset. For each candidate threshold applied to the 99.98th-percentile MWH, simulated events were labelled as *"tsunami"* when the percentile value exceeded the threshold and as *"non-tsunami"* otherwise.
>
> This comparison allowed the construction of a confusion matrix describing the classification performance for each threshold, including:

- True Positives (TP): events classified as tsunamis in both TSUSY and the NOAA catalogue.
  - True Negatives (TN): events classified as non-tsunamis in both datasets.
  - False Positives (FP): events classified as tsunamis in TSUSY but not recorded as tsunamis in NOAA.
  - False Negatives (FN): events recorded as tsunamis in NOAA but classified as non-tsunamis in TSUSY.

From these values, the standard classification metrics precision and recall were computed according to Eqs. (3) and (4):

$$Precision = \frac{TP}{TP+FP} \quad (3)$$

$$Recall = \frac{TP}{TP+FN} \quad (4)$$

Precision quantifies the proportion of predicted tsunami events that correspond to observed tsunamis, while recall measures the proportion of observed tsunamis that are successfully detected by the model.

To determine the optimal tsunami-occurrence threshold, the F1-score was used as a combined performance metric. This choice is motivated by the characteristics of the dataset used in this study. The number of tsunami events represents only a small fraction of the total number of simulated cases, resulting in a highly imbalanced classification problem, where non-tsunami events largely outnumber tsunami events. In such situations, commonly used metrics such as overall accuracy may provide misleading results, as a classifier could achieve high accuracy simply by predicting the majority class.

For this reason, the evaluation was based on the precision–recall framework, which is more appropriate for imbalanced datasets. The F1-score, defined as the harmonic mean of precision and recall, provides a balanced measure of classification performance by simultaneously accounting for false positives and false negatives. This makes it particularly suitable for problems where both types of classification error must be considered.

The F1-score evaluates the trade-off between precision and recall. The F1-score is defined as shown in Eq. (5):

$$F1 = 2 \times \frac{Precision \times Recall}{\mathrm{Precision} + \mathrm{Recall}} \quad (5)$$

The F1-score was computed for a range of candidate thresholds applied to the 99.98th-percentile MWH, and the threshold corresponding to the maximum F1-score was selected as the optimal tsunami-occurrence criterion.

Section 3.3 Selection of the tsunami threshold

Following the methodology described in Sect. 2.6, the classification performance of different candidate thresholds was evaluated using the F1-score, which provides a balanced metric combining precision and recall for this highly imbalanced classification problem. Figure 12 shows the variation of the F1-score as a function of the candidate tsunami-occurrence threshold applied to the 99.98th-percentile MWH.

The analysis reveals a maximum around 0.15 m, indicating the threshold that provides the best balance between precision and recall when compared with the NOAA tsunami catalogue.

Based on this result, a threshold of 0.15 m was selected as the tsunami-occurrence threshold. The corresponding confusion matrix is shown in Fig. 13, illustrating the classification performance relative to the NOAA catalogue. This value therefore represents the threshold that maximizes the classification agreement between the simulated tsunami catalogue and the observational NOAA tsunami records.

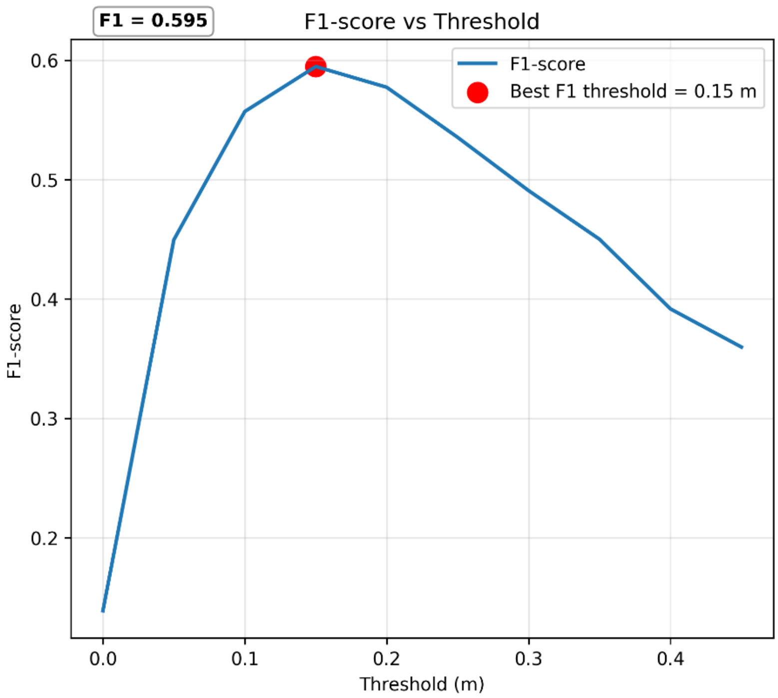


Figure 1. Variation of the F1-score as a function of the candidate tsunami-occurrence threshold applied to the 99.98th-percentile MWH.

The confusion matrix corresponding to the selected threshold (Fig. 13) allows a quantitative assessment of the classification performance. Overall, a high level of agreement is observed between the simulated classification and the NOAA catalogue, with 93.8 % of events correctly classified (true positives and true negatives).

The remaining 6.3 % of cases correspond to misclassifications, including 3.7 % false positives and 2.6 % false negatives. These discrepancies are primarily associated with intermediate and borderline cases, where tsunami generation is inherently uncertain, and are further analysed in Sect. 4.

Despite these differences, the selected threshold of 0.15 m captures a large proportion of the observed tsunami events while maintaining a relatively low number of false positives, supporting its suitability as a practical tsunami-occurrence criterion.

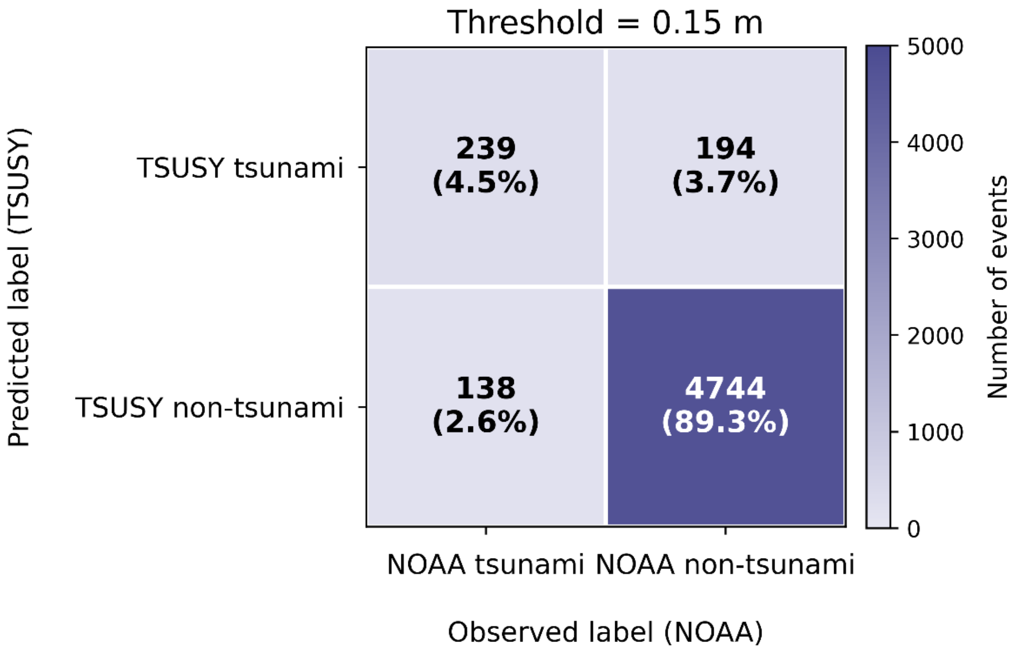


Figure 2. Confusion matrix obtained using the selected tsunami-occurrence threshold of 0.15 m applied to the 99.98th-percentile MWH.

Comment of the Referee 1 on line 510*:* *A commonly used benchmark is a wave amplitude of 0.2 m, not a run up of 0.2 m.*

Response to comment:

We thank the reviewer for pointing this out. However, following the revision of the methodology for threshold selection, the section where this sentence appeared has been removed from the manuscript, and therefore this specific issue no longer applies.

Comment of the Referee 1 on line 513: *'Japan Meteorological Agency, 2023' appears in References section as 'Japan Meteorological Agency, 2025'.*

Response to comment:

We thank the reviewer for this comment. However, following the revision of the methodology for threshold selection, the section where this sentence appeared has been removed from the manuscript, and therefore this specific issue no longer applies.

Comment of the Referee 1 on line 516: *Please clarify what 'the value obtained through the literature review' refers to. Is it equivalent to 'The value obtained from the NOAA catalogue'? However, line 150 states that the number of tsunamis extracted from the NOAA catalogue is 377, which contrasts with the number 340 indicated in line 516. The comparison of the number of events labelled as 'tsunami' and the number of actual tsunami occurrences appears to provide limited insight.*

Response to comment:

We thank the reviewer for pointing this out. However, following the revision of the methodology for threshold selection, the section where this sentence appeared has been removed from the manuscript, and therefore this specific issue no longer applies.

Comment of the Referee 1 on line 520*:* *Why 'this result aligns more closely with the NOAA catalogue'?*

Response to comment:

The revised analysis now evaluates the performance of different thresholds using classification metrics derived from the confusion matrix. The threshold of 0.15 m corresponds to the value that maximizes the F1-score, which balances precision (minimising false positives) and recall (minimising false negatives). In this sense, the 0.15 m threshold provides the best agreement with the NOAA catalogue when considering both types of classification error.

Comment of the Referee 1 on line 522: *I feel that the choice of 0.15 m over 0.2 m or any other value is not sufficiently supported. Beyond reporting the number of events labelled as 'tsunami', it would also be useful to compare, for each threshold value, (i) the number of events labelled as 'tsunami' that correspond to a NOAA catalogue record and (ii) the number of events labelled as 'nontsunami' that are associated with a NOAA catalogue record. This would provide a more robust indication of the adequacy of the selected threshold.*

Response to comment:

We thank the reviewer for this valuable suggestion. Following this recommendation, we have revised the methodology used to determine the tsunami-occurrence threshold in order to provide a more robust and quantitative justification.

The manuscript has been revised accordingly (Sect. 2.6 (line 342-377) *and 3.3* (line 518-545)*):*

Comment of the Referee 1 on line 525: *I would have expected that combining the 99.98th-percentile value with the number of grid cells exceeding the threshold would provide a better estimate than using only the value of the 99.98th-percentile. Did you attempt to develop a threshold based on such a combination?*

Response to comment:

The authors explored the potential use of a combined metric including both the 99.98th percentile value and the number of grid cells exceeding the threshold. However, preliminary tests indicated that the percentile value alone provided a sufficiently robust indicator of tsunami occurrence, while the additional metric mainly helped identify isolated numerical artefacts rather than improving the classification performance. For simplicity and interpretability, the final criterion was therefore based solely on the percentile value.

Comment of the Referee 1 on line 553-554: *Why not provide the exact rounded percentages (63% and 37%).*

Response to comment:

We agree with the reviewer. The text has been corrected accordingly (line 565-566):

> In relative terms, about 63 % of the NOAA events are also labelled as tsunamis when applying the proposed threshold. The remaining 37 % correspond to earthquakes that NOAA reports as tsunamis but that do not exceed the 0.15 m threshold or do not meet the spatial consistency condition.

Comment of the Referee 1 on line 555*:* *It would also be informative to mention that 55 % of the TSUSY events labelled as 'tsunami' correspond NOAA events, while the remaining 45% are not included in the NOAA catalogue, even though an explanation is provided in section 4.2.*

Response to comment:

We appreciate this insightful comment. The manuscript has been corrected accordingly (line 568-570):

> In relative terms, about 63 % of the NOAA events are also labelled as tsunamis when applying the proposed threshold. The remaining 37 % correspond to earthquakes that NOAA reports as tsunamis but that do not exceed the 0.15 m threshold or do not meet the spatial consistency condition. This mismatch is concentrated in magnitude ranges and source configurations where the tsunami potential is intrinsically uncertain. Conversely, about 55 % of the events labelled as tsunamis in the TSUSY Database correspond to tsunamis reported in the NOAA catalogue, while the remaining 45 % are not included in the NOAA database. These cases are discussed in Sect. 4.2.

Comment of the Referee 1 on line 588: *It would also be informative to indicate whether there are high-impact tsunamis that have been labelled as 'non-tsunami' or to state explicitly that no such cases exist.*

Response to comment:

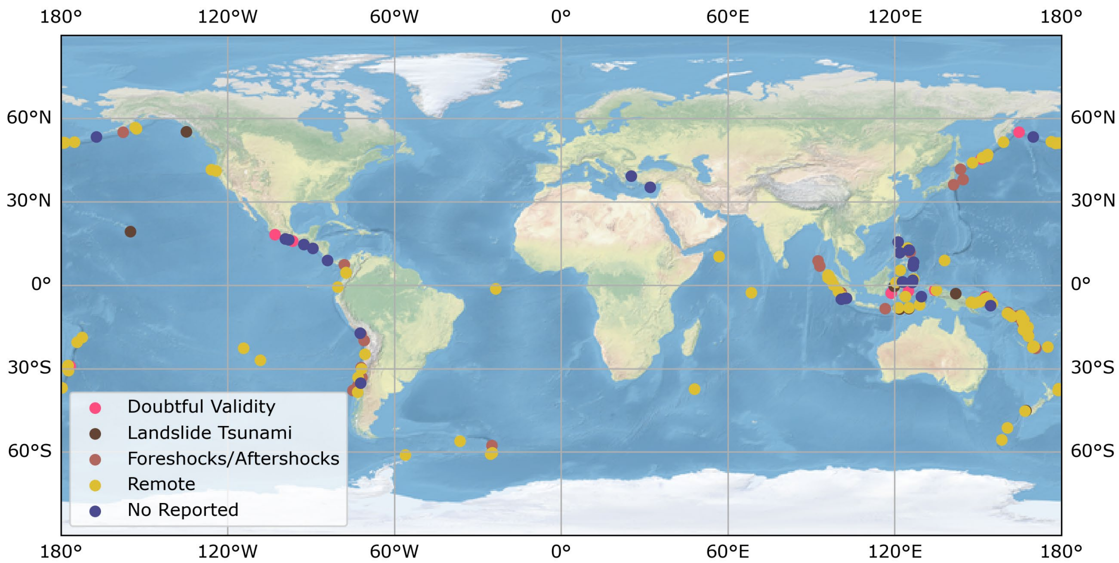
We appreciate the reviewer's suggestion. We have verified this aspect and confirm that no high-impact tsunamis are classified as "non-tsunami" by the proposed criterion. This clarification has been added to the revised manuscript (line 605-606):

> Taken together, these results confirm that the 0.15 m threshold is consistent with current operational practice. It reproduces nearly all large tsunamis ($M_w \geq 7$) in the NOAA catalogue, while strongly reducing the number of low-magnitude or deep events labelled as tsunamis. Importantly, no high-impact tsunami events in the NOAA catalogue are classified as non-tsunami by the proposed threshold. In the following subsection we move from the shared events to those that are labelled as tsunamis only in the TSUSY Database, examining why they are absent from the NOAA catalogue.

Comment of the Referee 1 on line 623: Please review the word 'Replica' in Figure 14 legend. Suggested: 'Aftershocks/Foreschocks'

Response to comment:

We thank the reviewer for this comment. The figure has been corrected accordingly (Figure 16):



Comment of the Referee 1 on line 629: *I do not follow this reasoning: 'Landslide-related and doubtful events are scattered along active margins, reflecting their dependence on local geological conditions and catalogue uncertainty'. Why should these types of events be located along active margins?*

Response to comment:

The authors thank the reviewer for this observation. After reconsidering the paragraph, we agree that the reasoning was not sufficiently supported by the analysis presented. The sentence has therefore been removed from the revised manuscript.

Comment of the Referee 1 on line 824: *Tsunami Inundation Database Portal, 2024, is not in alphabetical order.*

Response to comment:

We appreciate the reviewer highlighting this issue. The reference list has been corrected accordingly (line 855).

Comment of the Referee 1 on line 835-836*: Please review the letter case.*

Response to comment:

We thank the reviewer for pointing this out. The reference has been corrected accordingly (line 858):

> Wang, X. and Liu, P. L.-F.: Numerical simulations of the 2004 Indian Ocean tsunamis-coastal effects, Journal of Earthquake and Tsunami, 01, 273–297, https://doi.org/10.1142/S179343110700016X, 2007.

REFEREE 2

Comment of the Referee 2 (Abstract): *In the abstract, the statement starting with "Through numerical simulations, maximum wave heights were estimated for each event and .... " What is the location of the maximum wave height ? In the study domain? Along the coastal region? At the sourc ?*

Response to Comment:

The authors thank the reviewer for this comment. The maximum wave height refers to the maximum value computed within the entire simulation domain. This has been corrected in the revised manuscript (line 20):

> Through numerical simulations, maximum wave heights were estimated for each event as the maximum value within the entire simulation domain, and used to define thresholds […]

Comment of the Referee 2 on line *39:* *Similarly, In line 39, the location where the Estimated Wave Amplitude (EWA) and Estimated Time of Arrival (ETA) are computed should be indicated here*

Response to Comment:

The authors thank the reviewer for this comment. The Estimated Wave Amplitude (EWA) and Estimated Time of Arrival (ETA) are typically computed at predefined tsunami forecast points used by tsunami warning centres, which are generally located along coastlines or at specific locations of interest. The text has been revised to clarify this aspect (line 40-41):

> Additional data, such as Estimated Wave Amplitude (EWA) and Estimated Time of Arrival (ETA), are obtained at predefined tsunami forecast points (typically located along coastlines or at specific sites of interest) from pre-computed numerical scenarios or measured wave amplitudes from buoys or tidal gauges, […]

Comment of the Referee 2 on line *138*: *NOAA National Centers for Environmental Information, n.d is referenced. However, there is no link either in this sentence or in Reference list.*

Response to Comment:

The authors thank the reviewer for pointing this out. The reference has been revised accordingly (line 139):

> The NOAA tsunami catalogue (National Geophysical Data Center / World Data Service, 2024) provides a comprehensive […]

> National Geophysical Data Center / World Data Service: NCEI/WDS Global Historical Tsunami Database, NOAA National Centers for Environmental Information, https://doi.org/10.7289/V5PN93H7, 2024.

Comment of the Referee 2 on line *155*, *Same as Line 148*

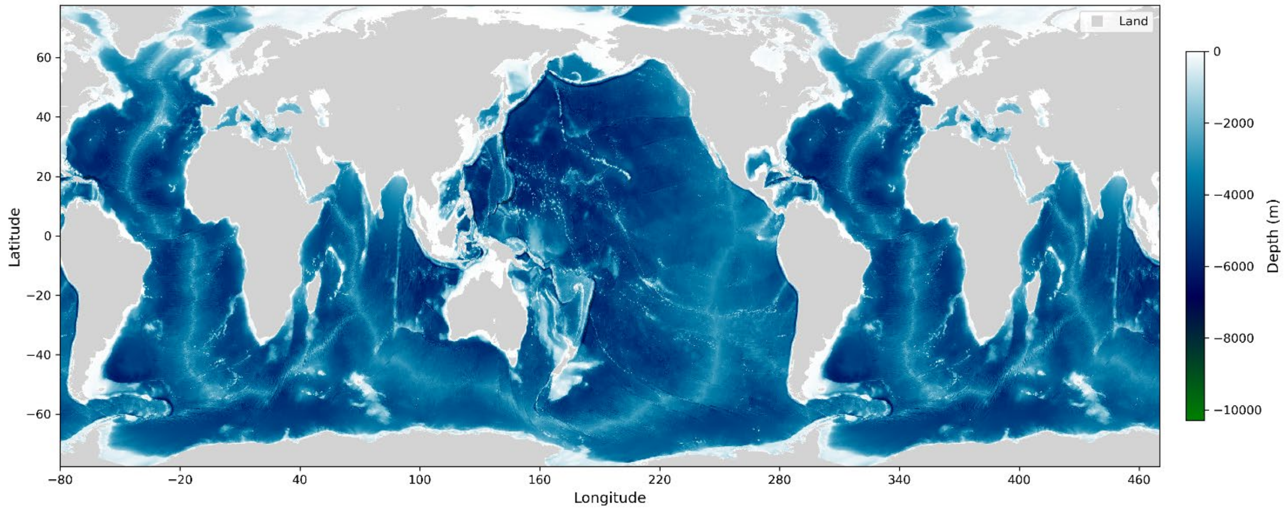
Response to Comment:

The authors thank the reviewer for this comment. The corresponding reference has been included as (U.S. Geological Survey, 2017), and the link has been added in the revised manuscript (line 158).

Comment of the Referee 2 on line *266*: *It is better to select the tic intervals of horizontal axis as 60 degree instead of 100 degree. However, 60 degree interval should not cause conflict with 100 degree intervals in Figure 7.*

Response to Comment:

The authors thank the reviewer for this suggestion. The figure has been modified with tic intervals of horizontal axis as 60 degrees (Figure 4).



Comment of the Referee 2 on line *531*: *The title of second column may be "# of events labelled as tsunami"*

Response to Comment:

The authors thank the reviewer for this suggestion. Following the revisions made in response to Reviewer 1, this table has been removed from the manuscript as the corresponding section has been revised. The justification of the threshold has been updated accordingly. This can be seen in the final revised manuscript Sect. 2.6 (line 342-377) *and 3.3* (line 518-545).

Comment of the Referee 2 on line *834*: *The link of this reference should also be given if aplicable*

Response to Comment:

The authors thank the reviewer for pointing this out. The reference link has been added in the revised manuscript (line 856):

U.S. Geological Survey: Earthquake Hazards Program, 2017, Advanced National Seismic System (ANSS) Comprehensive Catalog of Earthquake Events and Products: Various, 2017. [accessed: 18 Feb 2024]