One-by-one replies to the review reports on *Supershear-subshear-supershear rupture sequence during the 2025 Mandalay Earthquake in Myanmar*

Dear Editor and reviewer

We sincerely appreciate the thorough review and constructive comments on our original manuscript. We have carefully considered each comment and revised the manuscript accordingly.

First, we would like to explain a slight modification to our model after the comments from both reviewers on the reason we set the hypocentral distance of the rupture deceleration point as 82 km in the original manuscript. As described in the final paragraph of Section S1.2 (*Calculations to obtain the deceleration point and subshear rupture velocity*) in the modified Supplementary Material, the rupture time at the NPW station was changed from $t = 48$ s to $t = 50$ s. Furthermore, an algebraic expression for calculating the rupture deceleration position was added to this section. Consequently, the hypocentral distance of the rupture deceleration point (r_d) is determined to be 65.2–98.8 km. Based on this estimation, we re-executed our numerical simulation in case of $r_d = 65.2$ km. Our quantitative results and conclusions are not drastically altered.

In the following pages, we reply to the review comments, including our rationale for the revisions.

We have uploaded the following files via the submission system:

- `MainRevised.pdf` (clean version of the main text)
- `TrackChanges.pdf` (the main text with colored track changes, where gray and blue texts are the deleted and added words, respectively)
- `SuppRevised.pdf` (revised Supplementary Material)

Texcount reports 2861 words for MainRevised.pdf and 1029 words for SuppRevised.pdf. While the former narrowly meets Seismica's Fast Report criteria, the latter slightly exceeds it. We would appreciate your understanding.

For comments in the next review process, please refer to the line numbers in `MainRevised.pdf`. Although a track-changes version of the Supplementary Material was not prepared, the differences from the original are as follows:

- S1.1, S1.2, Fig.S1 and Fig.S2 are newly added.
- S1.3 to S1.5 remain largely unchanged, with the only revision being the distance from 82 km to 65.2 km.

We believe that the revised manuscript is now suitable for publication in *Seismica*.

Sincerely,

Shiro Hirano (corresponding author: hirano@hirosaki-u.ac.jp), Ryosuke Doke, and Takuto Maeda

Replies to Reviewer A

> line 11: Suggest changing "shallow slip up to 6m" to "shallow slip with up to 6 m of displacement" to avoid ambiguity. Can you be more specific here about what the previous inversion is? Something already published? By whom?

Generally, an abstract does not contain citations. Although we found many results of surface displacement analyses based on satellite imagery (e.g., NASA, JAXA, GFZ, etc.), these are 2-D displacement distributions, not slip distributions. Regardless, we omitted the maximum slip value from the abstract because the more important fact is the local minimum of slip, and the maximum slip is less correlated with our discussion.

> Abstract: Overall, can you provide more information here about your methods? A couple sentences should suffice, so the reader knows how you come to these conclusions.

We inserted these sentences:

1. *Our assessment,* ***based on the S-wave observation in the video and rupture arrival time at a seismic station 246 km south of the hypocenter****, suggests that…*, and
2. *This deceleration is also supported by* ***comparison between*** *the fault-normal acceleration patterns seen in the video* ***and that simulated by kinematic rupture modeling****.*

> line 24: You might also say they are limited by the cost of installing instruments.

We inserted the phrase.

> lines 29-31: Provide references.

We cite USGS (2025) and Inoue et al. (2025) therein.

> line 33: Has the video been uploaded to a more permanent location, for data availability?

We added the explanations and other sources in the Data and code availability section.

> line 39: What does "with shaking intensifying from 33 seconds" mean, exactly? Shaking intensified for the 33 seconds following timestamp 12:46:30? I'm also a little unclear about "Between 35 seconds and 1-2 seconds later" — does this mean between 35 s after timestamp 12:46:30 and 36-37 s after that timestamp? Perhaps you could express this as "Between 35-37 seconds after the 12:46:30 timestamp".

To avoid ambiguity, we modified the paragraph as follows: *The timestamps are in hh:mm:ss format. Hereinafter, the seconds component (ss) is defined as* T*. The footage indicated that subtle shaking had begun by* $T = 30$*, which intensified after* $T = 33$*. Between* $T = 35$ *and* $T = 37$*, the footage clearly shows…*

> line 44: Again, has this tweet and the Youtube video it points to been saved / made available somewhere else for continuity and data availability? I love the use of social media data in this article, but it needs to be treated as research data and archived accordingly.

We appreciate your concern. Although Wayback Machine is the world's most renowned tool for archiving purposes, unfortunately, its service appears to have ceased displaying tweets since last year (source). Instead, we have added a link to an alternative archiving web service in the main text and Supplementary Material.

> line 48: Can you define what counts as "near field"? Ex: within 5 km of the fault?

We inserted *(e.g., within 10 km from the fault trace)* therein.

> line 53: It would be good to have an introductory figure to show people the position and length of the fault, as well as location of epicentre. Perhaps you could combine figures 2 and 3 in order to have space to add a new introduction figure?

We have shown the location of the epicenter with the fault extent in Supplementary Material. In the modified manuscript, we refer to Figure S3 explicitly.

> line 73-74: Genuinely not sure: would it matter how far the CCTV and NPW are from the fault, in calculating the r distance? I'm guessing not, since the r values are much larger than the off-fault distances.

We agree that the distance from the observation point to the fault trace is negligible compared to the epicentral distance. Therefore, in our original manuscript, we did not differentiate between r representing the epicentral distance to the observation point or to the nearest point on the fault trace. We consider this to be unambiguous, but please let us know if you identify any specific misleading statements.

> line 76: Unit analysis for $V_{p}r =$ *[km/s]*[km] $=$ km^2/s, not seconds. I think you mean r/V_p to get a value in seconds. I'm also struggling to understand why the upper bound is as stated, even with this correction. Why is the upper bound the P-wave TT plus the arrival time at NPW minus the P-wave travel time to reach NPW? Apologies if this is simple and I'm just not catching on, but the way it is visualized in 2a is also confusing, as it seems to imply that you're treating this as a condition where the rupture moves at P-wave speed but is delayed in leaving the epicentre, which doesn't seem like a realistic treatment for the slowest speed of rupture propagation.

It was an erratum as you specified. We modified V_P to V_P^{-1}.

The upper bound (dashed white line) is not an actual rupture front but merely a condition. To avoid the ambiguity that could lead one to believe the rupture moves at P-wave speed but is delayed in leaving the epicenter, we modified the sentence as follows: *The upper bound accounts for the allowable delay time for the rupture to reach NPW at $t = t_N$. For any $r(< r_N)$, if this inequality is violated, the rupture cannot arrive at r_N at time $t = t_N$, even if its subsequent propagation occurs at the P-wave speed.* Moreover, we modified the dashed white line in Figure 2a so that it fades out near the hypocenter.

> line 93: Great work on this. I watched the video a few times to help understand what you're saying, and I suggest you may want to point the reader to this as well, by including the video as a supplementary file or pointing to a permanent link to it.

Uploading the video as our supplementary file could be an issue of copyright. We added the *S1 Details about the video* section in Supplementary Material. Moreover, we introduced the method to visualize the fault slip; see S2.1 *Image analysis to extract slip history from the video* in Supplementary Material.

> line 94-95: I think you are also relying on the result of Inoue et al., (2025) to establish that the rupture starts as supershear (their E1 episode to the south). I haven't read that paper very thoroughly, but it seems to me that the big takeaway from that work is that the rupture velocity is variable throughout rupture, which would also be good to highlight somewhere in your work.

We appreciate your suggestion. However, we must be cautious in claiming that (variable) rupture propagation velocities were obtained from seismic inversion results. Also, see the reply to the comment on line 98.

> fig 2: Label the vertical axis of (a). I see now from the caption that it is shared with (b), but this could be made clearer, perhaps by labelling it twice. Suggest changing "a.u." to "arb. unit" to differentiate with "astronomical

> unit", which is the most common meaning of a.u.

Following your advice, now the vertical axis has tick marks every 50 km. Also, we modified *Slip rate (a.u.)* to *Normalized slip rate*.

> line 96-97: See comment on line 76. Why is broken line (more commonly referred to as a 'dashed line') a 6 km/s slope but with delayed onset?

Following the previous comment, we added the necessity of the condition. Moreover, we added a schematic illustration Fig.S2 and *S1.2 Calculations to obtain the deceleration point and subshear rupture velocity* in Supplementary Material for more detail.

> line 98: E1 in Inoue et al., (2025) travelled south at 75km in 16s, which is 4.7 km/s, not 6 km/s. Can you clarify where you got this value from? What does the modelling look like when you try slower initiation velocities?

We apologize for the inaccurate statement. We modified *nearly equal to* V_P to *supershear*. However, for the very early stage of the event, 4.7 km/s is likely an underestimation, as their result also indicates *reaching about 40 km south of the epicenter at OT+8 s*. Inoue et al.'s description (*40 km within 8 s, and 75 km within 16 s*) was based on the broadest contour (0.1 m/s) in their Fig.3. It should be noted that the migration of the contour does not represent the propagation of the rupture front from the origin time; otherwise, the appearance of the first contour at 3--4 s in their Fig.3 would be anomalous. More robustly, the early-stage rupture velocity observed in Time-Strike diagrams is approximately 6.0 km/s, as shown in their Figure S2. In general, determining rupture velocity based on seismic inversions is not straightforward, and Okuwaki et al. (2020) discussed this difficulty in the first paragraph of their Section 4.3. Despite the difficulty in accurately determining rupture velocity, based on theoretical calculations,we concluded that the initial supershear rupture velocity was at least 5.0 km/s and set it to 6.0 km/s in our numerical simulations.

> line 99-101: Suggest rephrasing to "the observation of an approximately two-second delay between arrival of the S-wave and rupture front (Fig 2a) suggests that.." to avoid suggesting the S-wave was two-seconds long. I'm a bit unclear on how you get the 3km/s speed for the rupture front. It depends on when the rupture front decelerated, which you show in Fig 2a as happening at 82km from the epicentre. How was this selected? You're also assuming that the rupture front then resumed supershear speed at the CCTV camera, which isn't known. I suggest you rework the wording here to reflect that you are showing one possible version of the rupture propoagation speed, but that it is under-determined given there are only 2 actual measurements (at epicentral distance of 124 and 246 km). I would also suggest saying that the rupture has to have decelerated to sub-shear rupture speeds, simply because the S-wave arrives prior to the rupture front, without assigning it a speed at the moment it passes through the CCTV.

We apologize for the lack of our explanation. 82 km is an example from the model, and we revised our calculation because we employed the other pick of the rupture arrival at NPW as explained in the initial sentence of this document and Supplementary material S2.1. We modified lines 100--101 to read *...suggests that the rupture must have decelerated to about 2.7--3.1 km/s at 65--99 km from the hypocenter, as calculated in Supplementary Material.* In Supplementary Material, we added the algebra to derive the possible range of deceleration position and subshear rupture velocity.

> line 102: As mentioned above the finding of variable propagation speed is supported by the work of Inoue et al., (2025).

See the reply to the comment on line 98.

> line 104: I am concerned about assigning wave durations using the CCTV footage. Can you ensure they are not alternate arrivals, such as head waves? Is it necessary to assign durations?

Although a highly simplified calculation, assuming P-wave velocities of 6 km/s for the crust and 8 km/s for the mantle, with a crustal thickness of 30 km, the head wave travel time is 20.46 s for a hypocentral depth of 15 km and an epicentral distance of 124 km. In contrast, the direct P-wave travel time is 20.82 s. Therefore, while a head wave could slightly mislead the observed P-wave arrival time, our analysis is unaffected even if a head wave were observable from the video, as we do not specifically identify the P-wave arrival time.

> line 118: Perhaps there is a better term than "is controlled"? Such as "matches observations from the Myanmar event".

We modified it as you suggested.

> 123-124: If the 2- and 3-D modelling are central methods of this paper and its results, then the method needs to be included in the central body of the paper.

We are grateful that you appreciate the significant part of our work. We wrote the details of the methods in our Supplementary Material because of the strict word limit for Seismica's Fast Report.

> lines 125-126: Where does 5.125km/s come from? The time of the rupture front arrival to CCTV is unknown due to the absolute timing issue. Also please clarify that the sequence presented in 2b is non-unique but illustrative. How is the equation on line 126 determined?

5.125 km/s is the averaged rupture velocity calculated in line 57 of the original manuscript. In the revised manuscript, the velocity is now $\frac{246}{50} = 4.92$ km/s. We added *as calculated in the introduction*.

> line 130: What is the "impact of these longer durations" that "would arrive at the CCTV sire with an additional lag"?

Inoue et al. show that E1 peaks near the hypocenter 10-15 seconds after rupture initiation. This means that seismic waves generated by this peak would also arrive at the CCTV site more than 10 seconds after the P-wave arrival. However, the rupture observed in the video would have already reached the CCTV site by that time. This is because, otherwise, the rupture would not arrive at NPW in time, even if it propagated at the P-wave speed thereafter. Consequently, our model, which focuses on rupture arrival, does not need to consider a rupture measurement duration long enough to account for the E1 peak. We modified the sentense as *the impact of these longer durations would appear in the right side of the dashed white line in Fig.2a.*

> line 141: Given that only one super-sub-super shear situation was modelled, in which rupture velocity decreased at 82 km and then increased at 124 km, I don't think it can be said that "the results strongly suggest that the rupture decelerated sharply just before reaching the CCTV location.". This should likely be adjusted to something like "these results suggest that rupture decelerated prior to reaching the CCTV location". I would also ask about whether this pattern still holds true for other combinations of super-sub-super or even super-sub, decreasing and increasing velocities at different locations, per sensitivity testing.

As in the previous reply, the deceleration point of 82 km was merely one model, and we should say that the point is located in the range of 65--99 km. Following your comment, we modified the phrase to *these results suggest that the rupture decelerated prior to reaching the CCTV location*. Also, see *S1.2 Calculations to obtain the deceleration point and subshear rupture velocity* in Supplementary Material.

> line 143-145: This feels more like it should be part of your method, not discussion. Additional details are needed about the method employed here, or a reference should be provided if you obtained these processed values directly from someone else. This must be enough information for someone else to recreate your analysis. Ex: how was uncertainty calculated and propagated?

The details have been provided in Supplementary Material.

> line 147-148: It seems to me that there is strongly variable slip in the ~150-220 km epicentral distance region, rather than "widespread slip of 4 m".

We modified it to *a widespread average slip of 4 m, without a broad region of reduction.* As you pointed out, there appear to be some points with reduced slip, but most of these are accompanied by large error bars, which implies that the slip amount is less constrained due to noise included in the original satellite images. A key point is that the reduction at 40–60 km is robust because these points have relatively small error bars and are indicated at multiple locations.

> line 151-153: Can you provide references to better support the link between stress drop and rupture propagation speed?

This speculation is supported by theoretical discussion. Therefore, we have provided further explanation. In case, we must note that this local process is not related to the anti-correlation of average stress drop and average rupture velocity suggested by some observational studies (e.g., Causse & Song 2015).

> line 153-156: I'm pretty lost in this sentence. What does "the singularity is weaker than the square root" mean? I think this sentence may be trying to tie propagation speed to stress drop, but it needs some further description and potentially additional, more modern references to support the link.

Throughout the paragraphs, we modified the step-by-step explanations of the slip-stress drop relation, stress drop-energy release relation, and energy release-rupture velocity relation. We believe that this structure may be clarified in the modified manuscript. The term *the singularity* may have caused confusion. We have now clarified it as *the stress singularity.* Moreover, we have indicated the relevant section number from Freund's textbook.

> line 160-164: How many km from the epicentre is ~21.5N? I think you should more clearly tie this supposed segment boundary / seismic gap edge / discontinuity in fault dip angle to your analysis, and explain how your result bears on those previous findings.

First, we modified 50 km to 40–60 km because the reduction of slip distribution occurs broadly. In line 151 of the original manuscript, we wrote that 50 km from the epicenter is $\sim 21.5^\circ$. More precisely, it should be $22.0^\circ - 50 \times \frac{360^\circ}{40000} = 21.55...^\circ$, where the latitude of the epicenter is $\sim 22.0^\circ$ and 1 degree in latitude is $\frac{40000}{360^\circ}$ km. Obviously, our analysis lacks sufficient resolution to discuss values beyond the first decimal place, so we truncated them at the second decimal place.

> line 170-172: The 2D and 3D waveform modelling and the slip-rate/stress-drop changes are probably the most original and impactful contributions from this work, because Inoue et al., (2025) already established the variable rupture propagation speed and initial supershear behaviour, and Latour et al., (2025) had already analysed the video recording for S-wave arrival vs rupture onset, established the subshear behaviour at the CCTV location, and commented on the fault-normal motion as being consistent with a subshear rupture front. However, the 2D/3D modelling and fault displacement from satellite imagery pieces have insufficient methodology in the main text. I strongly suggest that the authors rework their manuscript to focus more heavily on the novel analysis and the

> synthesis of these multiple data sources, rather than somewhat duplicating or confirming what's already been established in Inoue and Latour.

The methodology for 2D/3D modeling and fault displacement from satellite imagery is detailed in Supplementary Material. Due to the strict word limit for Seismica's Fast Report, the methodology description could not be included in the main text. We appreciate your understanding. Note that variable rupture propagation speed is difficult to detect from seismic inversion analyses (see reply to the comment on line 98). Furthermore, Latour et al. did not explain the polarity of S-wave before the rupture, which is crucial for understanding rupture velocity as we discussed, nor did they explain why the fault-normal motion is consistent with a subshear rupture front.

Replies to Reviewer B

> Abstract: The following is suggested "We investigate the rupture dynamics of the 2025 Mw 7.7 Mandalay, Myanmar earthquake, using a video recording of surface rupture, strong motion recordings, and satellite imagery. Our assessment suggests that rupture decelerated to subshear speeds (∼3 km/s) from the initial supershear propagation (~6 km/s), before reaching the camera location. This deceleration is also supported by observed fault-normal acceleration patterns. Additionally, satellite imagery indicated a local minimum in slip (2–3 m) around 50 km south of the epicenter, suggesting a region of reduced stress drop that likely caused the temporary deceleration. Beyond this point, the rupture appears to have re-established supershear propagation."

We modified it as you suggested.

> Line 20: Perhaps, "Describing coseismic rupture, surface displacement, and deformation near a fault remains a critical challenge for both seismology and earthquake engineering."

We modified it as you suggested.

> Line 21-25: Two sentences as follows: Strong motion records within a few hundred meters of the fault have been obtained from events such as the 2000 Western Tottori earthquake (Fukuyama and Mikumo, 2007) and the 2023 Kahramanmaraş earthquake (METU-EERC, 2023). However, such observational opportunities are limited due to the difficulty in predicting rupture locations, which would support deployment of stations well in advance.

We modified it as you suggested.

> Line 25: "Such data significantly improve the spatial resolution of a strong motion distribution and play a crucial role in understanding near-fault ground motion." Although there is nothing wrong with the sentence, it is intuitive and does not help the present study. Perhaps, the authors intended to state that "Therefore, it is important not to rely only on seismic recordings, but to use whatever available data to study the rupture characteristics. In this context, this present study leverages different datasets, including video recording of surface rupture."

We modified it as you suggested except for the final sentence. In this first paragraph, the context about the video is not mentioned yet. Thus, we simply omit the final one.

> Line 27: "At 06:20 UTC on March 28, 2025, a magnitude 7.7 earthquake occurred along the Sagaing fault, which traverses Myanmar longitudinally." Longitudinally would refer to "along the longitudes". Wouldn't it be simpler to say "... Myanmar from north to south."
>
> Also, "Mw 7.7" instead of just "7.7".

We modified it as you suggested.

> Line 29: Perhaps, delete "oriented north-south". Also, this sentence needs a reference.

We deleted it and added references (USGS, 2025; Inoue et al., 2025) instead.

> Line 30-31: Perhaps, "Severe damage was reported in Myanmar and Thailand, with numerous instances of surface rupture, especially observed in areas along the fault trace."

We modified it as you suggested.

> Line 32-33: Seismica has in the past accepted data from social media (see Fernando et al., 2025, https://doi.org/10.26443/seismica.v4i1.1512). So, there should not be any problem. However, the Facebook link would not be useful for the paper. I would have insisted that the authors upload the video as supplementary material. However, there could be an issue of copyright. Obtaining written permission from the owner would be a best practice. In any case, it would be helpful to include a text in the supplementary material to provide the details about the video (source and other links). In that text, the weblinks can go in a footnote with "last accessed month and year" information. More links that can help the authors have confidence in the authenticity and reliability of the video.
>
> - https://www.livescience.com/planet-earth/earthquakes/first-of-its-kind-video-captures-the-terrifying-moment-the-ground-tore-apart-during-major-myanmar-earthquake
> - https://www.youtube.com/watch?v=IQ6pED5sDEM
> - https://www.cbc.ca/player/play/video/9.6763872
> - https://earthsky.org/earth/myanmar-earthquake-is-this-the-first-fault-rupture-on-video/
>
> In that text, the authors may quote the "fair use" clause in using the data for research purposes. see https://www.copyright.gov/fair-use/ Now, the sentence in the manuscript can read: "Three days after the earthquake, a video purportedly capturing coseismic surface rupture due to the mainshock was made available online (for details, see the Supplementary Material)."

We deeply appreciate your suggestion regarding the source, which presented copyright concerns. Unfortunately, we are unaware of the contact information for the video's copyright holder. We have relocated detailed explanations of the video, including its original source (Facebook), a secondary archive (YouTube), and an authentic and reliable source (BBC News) to the "Data and code availability" section, deeming it more suitable than the Supplementary Material. The fair use clause is also addressed therein.

> Line 36: perhaps, "Thazi town."

We modified it as you suggested.

> Line 36: The last line of this paragraph would be better placed in the next paragraph. Perhaps, "The shadows seen in the video suggested that the camera was facing south (Figure 1). The timestamp (in seconds), in the upper right corner of the frame, appears ... "

We modified the first sentence to *"The shadows seen in the video suggested that the camera was facing southwest (Latour et al., 2025)."* and the second one as you suggested.

> Line 38.. "USGS earthquake origin time (USGS, 2025)."

We modified it as you suggested.

> Line 38: Instead of "The video begins to subtly ...", perhaps, "The footage indicated that subtle shaking initiated around 12:46:30, which intensified after 33 seconds. "

Given a comment from Reviewer A, we modified the surrounding sentences as *The timestamps are in hh:mm:ss format. Hereinafter, the seconds component (ss) is defined as T. The footage indicated that subtle shaking had begun by $T = 30$, which intensified after $T = 33$. Between $T = 35$ and $T = 37$, the footage clearly shows right-lateral strike-slip displacement of the ground beyond the fence on the right side of the video frames and the foreground gate.*

> Line 41. Instead of "screen", "video frames"

We modified it as you suggested.

> Line 41-43: Perhaps, “This recording is likely the world’s first direct observation of surface fault rupture during an earthquake. It provides direct information about the rupture at a location where no seismographs were installed.”

We modified it as you suggested.

> Line 44. Is this the first author’s X account? (https://x.com/Bimaterial/status/ 1922157655641952512) If yes, the results of this initial analysis can be included/provided in the supplementary material or even in the main text (having four figures would be okay). It would serve as evidence to show that the video constitutes useful data. If that is not the first author’s account, perhaps, the citation could be “Pers. Comm.”. Of course, the authors need to communicate with the person (having that X account). At the same time, providing a link to a social media posting is best avoided. So, the following is suggested. “An initial analysis of the video revealed a pulse-like slip velocity function that completed within approximately two seconds (either a figure or reference to Supplementary evidence or XXXX, pers. comm.).”

We are grateful for your suggestion. Yes, the account belongs to the first author. We added the image analysis methods to Supplementary Material S1.1, including Figure S1.

> Line 45-47: “This result has since been refined through the analysis of numerous additional points within the video, indicating that the maximum slip velocity reached 3 m/s (Latour et al., 2025), or 4.5 m/s considering field observations (Gao et al., 2025).”
>
> How is the result refined when it was slip duration in the first place, and slip velocity in these cases?

The initial result did not have a physical quantity for its amplitude because it was a raw output of video analysis. Hence, we modified the sentence to *"Although the dimension of the initial result was pixels/s, it has since been refined through..."* Also, after Latour et al.'s preprint, we added an peer-reviewed paper (Kearse & Kaneko 2025 TSR) as a reference.

> Line 49. Perhaps, “This lone station...”

We modified it as you suggested.

> Line 51. Perhaps, “ ... crucial to leverage all potential data ...”

We modified it as you suggested.

> Line 53. Perhaps, “An inversion ...” instead of “Notably, an inversion ...”

We modified it as you suggested.

> Line 56-57. Perhaps, ”... approximately 48 s after rupture initiation, with no clear S-wave priorly observed.“

Except for 50 s instead of 48 s as explained in the initial sentence of this document and Supplementary material S2.1., we modified it as you suggested.

> Line 65. Perhaps, “Therefore, a change in the rupture propagation velocity would be consistent”.

We modified it as you suggested.

> Line 66: instead of “... we present results estimating ...”, “... we estimate ...”

We modified it as you suggested.

> Line 66: What would "surface strong ground motion" mean?

We modified it to *ground motion*.

> Line 67-69: "Specifically, insights from ground motion in the fault-normal direction will be used to demonstrate that while the fault rupture generally propagated at supershear speeds, it likely experienced a deceleration to subshear speeds just before reaching the CCTV location." can be rephrased as follows ... "Specifically, we demonstrate that the fault rupture decelerated to subshear speeds just before reaching the CCTV location, although it generally propagated at supershear speed."

We modified it as you suggested.

> Figure 1. Does this figure contain two panels? If yes, it can be explicitly mentioned in the figure caption.

We labeled the two panels (a) and (b) and modified the caption.

> Figure 1. Were the horizontal slices extracted for an entire frame (including the fence on the right)? If so, can that be shown?

We added indicators for the position of slices to Fig.1a and modified the caption.

> Figure 1 Caption. Perhaps, "... the timestamp appears to be approximately five minutes behind the actual local time when compared to USGS (2025)."

We modified it as you suggested.

> Line 72-73. 's' instead of 'sec'

We modified it as you suggested.

> Line 76. The time window is a bit confusing. $V_p r$ and $V_p r_N$ do not correspond to time. Would these be r/V_p and r_N/V_p?

It was an erratum as you specified. We modified V_P to V_P^{-1}.

> Line 82. What exactly is "stacked vertically"? Is it averaging or is it summation?

We modified the phrase in the line and the caption of Figure 2. Specifically, the modified caption is now unambiguous: *A stacked image obtained by extracting a 1-pixel-height slice along the horizontal line in (a) and aligning these slices vertically.*

> Line 92. Instead of "screen", "video frames (Fig. 1)"

We modified it as you suggested.

> Line 95-97. This text describing the plots can be removed or reworded, as it is best given in the figure caption.

We modified it as you suggested.

> Figure 2. What would be "a.u." as a unit of slip rate? Instead of the star symbol, perhaps the station is better depicted by a triangle.

The abbreviation *a.u.* stands for *arbitrary unit*. In case *a.u.* is unfamiliar to readers, we modified it to *Normalized slip rate*.

> Figure 2. If it matters, having drastic color changes in the colormap might improve the visual resolution of the contour.

The nuances of the color are not important because the blue region, indicating the slip pulse, is translational and has no variation along the rupture front. Thus, we believe the original colormap provides sufficient information.

> Figure 2. Caption. The authors are requested to provide a description of the white lines (dotted and dashed) and the blue thick lines.

We thank you for your request. With some description, we changed the four white lines to two white lines and two yellow lines for comprehensibility. Additionally, we added an explanation that the blue is a part of gray-to-blue color contour, not a line.

> Figure 2. Caption. Perhaps, "The inset shows a zoomed plot where the horizontal black bar indicates the two-second duration of the S-wave observed at the CCTV site (124 km)."

We modified it as you suggested.

> Figure 2. How do the authors determine that the deceleration starts at ~ 82 km away (south) from the epicenter?

We apologize for the lack of our explanation. 82 km is an example from the model. We modified lines 100--101 to read *"...suggests that the rupture must have decelerated to about 2.7--3.1 km/s at 65--99 km from the hypocenter, as calculated in the Supplementary Material."* In the Supplementary Material, we added the algebra to derive the possible range of deceleration position and subshear rupture velocity.

> While I am not sure whether this would be pertinent or not, I'd like to point out that the segmented rupture model given by USGS (2025) has rupture nucleating on one segment and propagating to another one with a minor shift in the strike angle. That transition happens around 115 km south of the hypocenter. There is another paper (Melgar et al., 2025) that is likely to be finalized by next week. One of their rupture models has a change in fault geometry (dip angle) at around 100 km south of the hypocenter. Reference:
>
> - Melgar, D., Weldon, R., Wang, Y., Bato, M.G., Aung, L.T., Shi, X., Wiwegwin, W., Khaing, S.N., Min, S., Thant, M. and Speed, C., 2025. Supershear source model of the 2025 Mw 7.8 Myanmar earthquake and paleoseismology of the Sagaing Fault: regions of significant overlap with past earthquakes, submitted to Seismica. https://eartharxiv.org/repository/view/9343/
>
> I see that the authors have discussed the possible impact of fault geometry in the later part of the Discussion section.

We appreciate your constructive comments.

The source models by USGS (2025) and Melgar et al. (preprint) used a geologically known fault geometry model (e.g., Tin et al., 2022) as input. This implies that changes in fault parameters during rupture were assumptions in their studies.

In contrast, the Potency Density Tensor Inversion method executed by Inoue et al. (2025) enables the simultaneous inversion of strike, dip, and rake angles of the fault without prior assumptions. Therefore, their result provides stronger seismological evidence that the fault parameters changed during rupture. Furthermore, their result indicates a significant difference in the dip angle between the initial 10 seconds of rupture and the subsequent 10 seconds.

Accordingly, in our revised manuscript, we have added content regarding the findings of Inoue et al. to discuss the possibility that the fault parameters varied, not only from a geological but also from a seismological standpoint. Please refer to the final paragraph of Section 3.

> Line 126: Would this be Fig. 2a?

We modified it as you suggested.

> Section 2.2. Instead of “screen”, “video frames”.

We modified it as you suggested.

> Figure 3. Can we include empirical data (or traces inferred from the observations) in these plots? If not, this analysis may amount to developing a theoretical model.

We simulated the fault-normal ground acceleration, which was implied by the movement of the sliding gate prior to the rupture front arrival in the video frames. If the acceleration had been observed at the CCTV site by a seismic instrument, we could plot the waveform in the figure. However, the only component quantitatively obtained from the video is the fault slip. Therefore, a direct comparison of the simulated waveforms and the quantity extracted from the video frames is unfortunately impossible.

> Line 154. “... stress singularity ...”

We modified it as you suggested.

> Line 161. “... Sagaing fault has been previously suggested.” This sentence needs a reference.

Because the statement is evidenced by the next sentence, we moved it after that sentence.

> Supplement Material. Citation format in either Author (YYYY) or (Author, YYYY) could be easier to track. If numbering is still preferable, they can be ordered according to the citations. Presently, Tada and Madariaga (2000) is “9”, which would be “1”. Figure S1 can be placed after the reference list.

We changed the citations to the Author-Year format and placed figures after the reference list.