Dear Dr Okuwaki,

Many thanks for facilitating the rapid reviews of our paper. We are grateful to you and the Dr Kumar Thingbaijam for your comments and have outlined our responses in this document.

In summary:

- The main map figure (Fig. 1) has been reworked and now includes more detail and more visible features,
- Additional seismic discussion, additional moment tensor inversions and P/S ratios for nearby events, has been added,
- Much of the methodology for the social media section has been moved to the supplementary materials,
- The social media results section has been condensed to reduce space,
- The conclusions have been reworked to be more concise.

In this document, and the tracked changes version of the paper,

Additions or revised text are in blue

Deletions or moved material are in red

Comments (in this response file only) are in orange.

Many thanks
Ben

Dr Benjamin Fernando

On behalf of the authors

Fernanado et al. dismissed the fake news of a nuclear test and demonstrated that it was actually a tectonic Mw~4.5 earthquake that happened.

While the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) already reported that the event was consistent with previous earthquakes of similar magnitudes, the authors carried out independent research to report the source characteristics of the event. They also suggested a strategy to tackle misinformation specifically related to earthquakes.

While the manuscript is interesting, the topic could easily become less seismological and more relevant for social or communication science. Previously, we had a paper (Stähler et al., 2022) addressing a similar kind of issue, but with analysis and theme focused on seismological techniques. Taking that as an example, I would like to request that authors revisit their manuscript

1. “Data and Methods” - Instead of “Seismic Analysis” so that paper is more focus on providing seismological data and interpretations

We have made this change.

2. It will be great if the authors can merge Sections 3, 4 , 5 into a single section - “Discussion” and that discussion on social media can be reduced to about 50% of the text by summarizing much of the details.

We have addressed this by eliminating sub-sections (especially on interpretations from different languages) to significantly condense text, and moving text into the discussions suggestion (as suggested by the second reviewer).

3. Lastly, can the title be changed to make it more focused on seismological investigation?

We appreciate this suggestion, but feel that one of the strengths of this paper is the combination of in-depth seismic analysis (of which we have added more) and social media analysis. We would prefer to keep the title as-is, if amenable to the reviewer and editor.

Reference: Stähler, S.C., Zenhäusern, G., Clinton, J. and Giardini, D., 2022. Locating the Nordstream explosions using polarization analysis. Seismica, 1(1). I have a few more comments listed below and hope that they will be useful to the authors:

Introduction: It might be useful to note here some of the challenges relevant to the strategy suggested by the authors in the conclusion (relevant to data modeling such as event depth, need for moment tensor solutions, role of seismological community and official communications).

We have added this in as further context at the end of the introduction:

Given that communication is as much a part of the modern nuclear monitoring pipeline as classical source discrimination (e.g. Murphy, 1996) and modelling (e.g. Fisk, 2006) this event may serve as a potential learning experience.

- "E202410051915A" - is this identifier for GCMT catalogue?

Yes, but because the event cannot be found in the online GCMT catalogue we have removed the reference number to avoid confusion. The sentence now reads:

Although it is below the magnitude for which the Global Centroid Moment Tensor (GCMT) project (Ekström et al, 2024) usually computes moment tensors, an inversion under this methodology was undertaken for this paper.

- Figure 1. Would it be possible to have an inset whether the study is indicated (perhaps, box) on a larger regional or a global map? Additionally, blue triangles (in fact, all the markers) are hard to see - could they be a litter larger?

The figures have been reworked to reflect these suggestions and the changes are summarised at the end of this document.

- Line 66-67. "Seismic data from this event are shown in Fig. 2; between 0.05 and 0.5 s in panel A to highlight body waves and between 15 and 30 s in panel B to highlight surface waves". Perhaps, Seismic data from this event are shown in Fig. 2. Fig 2A shows body waves between 0.05 and 0.5 s while Fig. 2B highlights surface waves between 15 and 30 s.

We have made this change, the sentence now reads:

Seismic data from this event are shown in Fig. 2; Fig. 2A shows body waves between 0.05 and 0.5 s while Fig. 2B highlights surface waves between 15 and 30 s.

- Likewise, “ All traces in A.... “ can be “All traces shown in Fig. 2A …….”

We have made this change. The sentence now reads:

All traces in Fig. 2A show a clear P-wave arrival (dashed blue line). S-wave arrivals (dashed orange line) are present, but they are more variable in amplitude between stations.

- Line 84: It would be interesting to see the distribution of P/S ratios. The analysis/interpretation can be also provided based on the distribution rather than single median value.

We have added in additional computations of P/S ratios for three more events that are of similar size and location, which can be found in the supplement as Figs. S1.1-1.3. Additionally, we now reference these in the main body of the text when discussing P/S ratios:

Although this value is on the high end of uncorrected P/S ratios for natural seismic events recorded at local to regional distances, it is not inconsistent with measured P/S ratios of known tectonic events (see Wang et al., 2021). Figs. S1.1-1.3 in the supplement highlight potentially higher-than-expected and significantly variable in P/S ratios for three more events in this area. This suggests that the observed ratios are a consequence of the region and its characteristic seismicity rather than something particularly unusual about this event.

- Line 86: “... (Wang et al., 2021).” perhaps, “ … (see Wang et al., 2021).”

We have made this change.

- Conclusion: Would the order be appropriate (considering the role of seismologists): “Fixing Depth”, “Moment Tensor solution”, “Official Communications”, and then, “Community Fake Checking” ?

This is a great suggestion and we are pleased to have made the change.

- Please check for typos such as in spelling, use of parentheses

The paper has been thoroughly proof-read and edited again. We apologise for any previous issues.

Reviewer B
(Ryo Okuwaki, handling editor)

The authors report the seismological analyses on the M 4.5 earthquake occurred in Iran on October 5, 2024. They performed the moment tensor inversion for this event using the intermediate to long period (longer than 40 s) seismic records at regional distances. The authors also analyzed the aftermath or impact of this particular event, primarily focusing on the posts on social media that claim the event was a nuclear test. Based on the moment tensor solution and its consistency with the tectonic setting surrounding the event, the authors derive a conclusion that the event was a tectonic earthquake, rather than the nuclear test.

- # major comments
  I find the manuscript interesting and important because the authors conducted seismological analyses on the smaller scale event that was not listed in the publicly available catalog (e.g., GCMT catalog). Such information can be fundamental to further explore the source mechanism of the event, which may sometimes be attributed to the discussion about whether the event was a tectonic earthquake or not. Whilst the authors' observations and analyses on the social media posts are extensive and wide-covering to investigate the potential misinformation about the event, I am still wondering if the authors could strengthen the authors' conclusion by focusing more on the seismological analyses on the particular event. For example, as the authors write in L87–90, a couple of earthquakes with similar magnitude occurred near the 2024-10-05 event. Perhaps the authors could show additional seismological evidence by looking at the waveform similarities between the 2024-10-05 event and these nearby events, or by performing the similar CMT inversion of these events, so that the conclusion could be more convincing that the 2024-10-05 event can be interpreted as an earthquake that aligns with the regional tectonic environment and the background seismicity.

This is a great suggestion, and we have included other events in the discussion to provide a robust comparison. The changes are detailed in the ‘Changes to figures’ section at the end of this document.

For the use of social media materials, I see some of the materials (screen captures) may not have to be presented in the supplementary materials. For example, Figures S2.9 and S2.12 have already been presented in the publicly accessible websites that the authors referred to in the manuscript. For other supplementary materials (especially screen captures of the social media posts), I understand the use of such kinds of

materials in Seismica is not for profit, so it should be fair use in that particular sense (also as the authors explained in the supplementary materials), but I would expect the supplementary tables, figures, and texts should be referenced by each in the main text (otherwise, these are not necessary I think). From these points of view, I suggest that the authors could consider reducing the number of the display items in the supplementary materials if possible, together with reducing the volume of Sections 3, 4 and 5.

We agree, and the supplement has been considerably re-worked. We have made sure that everything that remains in the supplement is properly referenced and ordered, and some other material has been removed.

- # minor comments
  Abstract
  I would like to ask the authors describing how the source mechanism is evaluated; for example, "we performed centroid moment tensor inversion using the regional waveforms to explore the source mechanism" and "we find the event is characterized by reverse faulting at shallow depth, which aligns with the surrounding tectonic setting."

We have added in further clarification in two places:

A moment-tensor inversion for this earthquake was carried out using the GCMT methodology of Ekström et al (2012). The inversion used 38 individual components from 22 unique seismic stations and was based on surface waves with periods longer than 40~s. The period band used was selected to optimise the inversion, given the lower magnitude of the source as compared to normal GCMT inversions.

And:

This moment tensor is indicative of a shallow-dipping reverse-fault event, commensurate with the compressional setting of the Iranian interior (e.g. Tavakoli et al (1999)).

- I understand the earthquake happened in the particular timing and place of interest, but I would simply describe that the M 4.5 earthquake happened in Iran, potential misinformation propagated through social media (claiming the event was not a tectonic earthquake), and the seismological evidence and analyses suggest the event is likely an earthquake in Abstract section.

We hope the abstract is now more clear with respect to the rest of the paper, and have also added in a copy of the same abstract in Persian.

- L41: localised to said affected populations -> localised to the affected populations?

We have made this change, it now reads:

However, impacts are generally localised to the affected populations.

- L42: 2024-10-05 Iran M 4.5 earthquake -> 2024-10-05 Iran M 4.5 earthquake (see details of origin information in the later section)

This has been changed and the sentence now reads:

The 2024-10-05 Iran M 4.5 earthquake (seismically analysed in Sec. 2.3) was unusual in that the spread of misinformation and disinformation had potentially serious and widespread geopolitical consequences.

- L54: Please cite the ANSS ComCat.
  https://earthquake.usgs.gov/data/comcat/
  U.S. Geological Survey, Earthquake Hazards Program, 2017, Advanced National Seismic System (ANSS) Comprehensive Catalog of Earthquake Events and Products: Various, https://doi.org/10.5066/F7MS3QZH.

This reference has been added.

- L58: I cannot find the relevant solution of E202410051915A in the GCMT catalog*. Do the authors mean that this ID was registered after automated detection (e.g., https://www.ldeo.columbia.edu/~ekstrom/Research/SWD/current/RADB_SWD_grd.html) but was later dropped from the list after the quality control? I would appreciate it if the authors could clarify which criteria were the reasons why the E202410051915A is not currently listed in the GCMT catalog.
  (*to reproduce the list of GCMT solutions, where I cannot find E202410051915A)
  https://www.globalcmt.org/cgi-bin/globalcmt-cgi-bin/CMT5/form?itype=ymd&yr=2024&mo=10&day=1&oyr=1976&omo=1&oday=1&jyr=1976&jday=1&ojyr=1976&o

jday=1&otype=nd&nday=10&lmw=0&umw=10&lms=0&ums=10&lmb=0&umb=10&llat=-90&ulat=90&llon=-180&ulon=180&lhd=0&uhd=1000&lts=-9999&uts=9999&lpe1=0&upe1=90&lpe2=0&upe2=90&list=0

In response to this comment and that made by the other reviewer, we have removed the catalogue number to avoid confusion because the event is not publicly listed in this database. The relevant sentence now reads:

Although it is below the magnitude for which the Global Centroid Moment Tensor (GCMT) project (Ekström et al, 2024) usually computes moment tensors, an inversion under this methodology was undertaken for this paper.

- L59: The USGS estimated epicentre at 35.377°N 52.891°E places -> The USGS estimated epicentre at 35.377°N 52.891°E, placing?

We believe that this sentence does currently make sense as is, using ‘estimated’ as an adjective rather than a verb:

The USGS estimated epicentre at 35.377°N 52.891°E places this event in an extremely tectonically active region of Iran

- L59: an extremely tectonically -> a tectonically

We have made this change:

The USGS estimated epicentre at 35.377°N 52.891°E places this event in an extremely tectonically active region of Iran

- L60: A regional map showing the tectonic plates and their relative motion(s) can be placed inset in Fig. 1, so that the readers could easily get the tectonic setting that affects the earthquake occurrence in this region.

We agree, the figures have been completely reworked to reflect these suggestions and the changes are summarised at the end of this document.

- L61: Could it be possible to show these M > 7 events on a map of Fig. 1 along with the background seismicity (let's say M > 4)?

We agree, the figures have been completely reworked to reflect these suggestions and the changes are summarised at the end of this document.

- L64: 5-15 degrees of the event -> 5-15 degrees of the event (Fig. 1)

Because the map in Fig. 1 is now clearer and shows the signals gathered both regionally and globally, we have removed this sentence.

- L66: These data shown in Fig. 2 are used for the inversion? Please clarify this in the text.

This has been edited to be more clear:

These data are from regional seismometers that are not used in the GCMT surface wave inversion, but are instead shown to illustrate body phase presence and variation.

- L66: Also, please show which stations (traces) in Fig. 2 are selected from the ones shown in Fig. 1, either by showing the station codes in Fig. 2 or point the locations on a map of Fig. 1.

We agree that this should have been clearer, the figures and captions have been completely reworked to reflect these suggestions and the changes are summarised at the end of this document.

- Figure 1: I am keen to know how the other GCMT solutions around this region look like, and how these can be related to the authors' own solution of the 2024-10-05 event and the regional tectonics and active faults. Could it be possible to make an inset map displaying a set of GCMT solutions in a closer map scale; for example, 50°E ≤ longitude ≤ 55°E and 34°N ≤ latitude ≤ 37°N?

We have performed moment-tensor and P/S ratio analysis for select further events; these are presented in reworked figures and the changes are summarised at the end of this document.

- L73: "robust analysis of the source location and mechanism is nonetheless possible" - I am not immediately convinced by how the authors evaluated this

robustness or uncertainty in their inversion. I would appreciate it if the authors could clarify or discuss this point in the text.

We have clarified this to explain:

Robust (meaning a well-converged and stable solution during the moment tensor inversion) analysis of the source location is nonetheless possible.

- L77: Perhaps this period 40 s might be a bit shorter than what is supposed in the GCMT filtering strategy (150 s and 50 s for surface waves for Mw < 5.5)? Is this related to the earthquake size (magnitude) that is relatively smaller than that of the regular target of the GCMT project? I am curious how the authors selected this particular period for the authors' analysis.

Indeed, this is a good question. Our standard GCMT analysis uses a passband of 50-150 sec for surface waves. Experience has shown that this strikes a good balance between signal-to-noise in the seismograms and ability to predict surface-wave phase with high precision. Filtering the surface waves to shorter periods increases the signal-to-noise ratio, but there is greater uncertainty in the prediction of the surface-wave propagation phase, and hence the determination of the focal mechanism. For the two small earthquakes analyzed here, we chose to include the shorter periods, but avoided using stations at large distances, for which the uncertainties in propagation phase are larger. We have (briefly) clarified this:

The period band used was selected to optimise the inversion, given the lower magnitude of the source as compared to normal GCMT inversions.

- L78(L382): It would be great if the authors could explain how they handle depths when working on the inversion for this particular event. I presume the depth resolution is not very expected when working with surface waves, but please clarify the reason or procedure of determining (fixing) depths in the viewpoint of the authors' CMT inversion.

We chose to fix the focal depth of the earthquake since the long-period surface-wave data do not provide good independent constraints on the event depth. We chose 12 km (the shallowest we use in standard GCMT analysis) since earthquakes in Iran predominantly occur in the shallow crust, and both earthquakes were reported at depths shallower than 15 km.

Depth is fixed at 12.0 km here (the standard GCMT value where a robust estimate cannot be made).

- L87: This statement could have been supported by evidence (not only by quoting the CTBTO's statement). For example, could it be possible to perform the same inversion for these events (15 January 2018 and 25 August 2015) or similar ones near the 2024-10-05 event? Or, I am very much keen to know how the corresponding signal from the 2024-10-05 can be correlated with those from the similar events nearby (e.g., 15 January 2018 and 25 August 2015).

As per previous comments, we have undertaken this analysis and summarise the changes to the text and figures at the end of this document.

- Fig. 3: This figure can be moved into the supplementary materials. It would be nice if the two traces at IU.GNI station were plotted in the same time scale (e.g., 15 min.) and the same amplitude scale (-10 to 10 \mu m/s), so that the authors could strengthen that the two traces are from the different events.

This figure has been moved to the supplement and adjusted as suggested. It is now Fig. S.3.9.

- L91–136: The explanation of the strategy can be moved into the supplementary materials.

We have moved this to a new section in the supplement called Sec. 2.3.

- L102: possible to use view some -> possible to view some

This has been changed, the sentence now reads:

Further details, and a list of search terms, are given in the supplement. We also note that it is possible to use view some of this material through archives such as Perma

- L137–283: For Section 4, I see the misleading seismograms (Fig. 3 or Fig. S2.9) and the waveform comparison with the one from the nuclear test (Fig. S2.13) are directly related to the authors' findings to be discussed, which can be a key

scope of the relevant discussion. Although I see Section 5 is very important and I find the authors' study here plays a significant role in fact checking based on seismological knowledge, this section can be compressed into one of the short components in the Discussion section. I find "Community fact checking" in Section 6 nicely summarizes Section 5, so this can be moved into the Discussion section along with the necessary details.

We agree, and have reworked sections 3-6 to address this.

- L333–396: I feel the Conclusions section could have been concise. Whilst I see "6.1 Suggested communication strategies" as very important to strengthen the authors' study and finding (and I agree with the authors' statement here in general), the contents of this subsection can be moved in the Discussion section and discussed in advance before reaching to the conclusion.

We have moved the ‘suggested communication strategies’ section into the discussion to leave the conclusions more concise, and performed further edits.

- Table 2: I cannot see the links to the websites numbered in 2~13. I would suggest the authors move this table with links in the supplementary materials.

We have moved this entire table to the supplementary material where it appears as Table S3.1.

Changes to figures

Because the figures in this paper have undergone substantial revision, we summarise these changes here rather than through in-line comments above for brevity.

Fig. 1:

- As requested, Fig. 1 now includes a broader-scale map illustrating the tectonic plates in the region and background seismicity (restricted to earthquakes larger than M > 6 in the last ten years).
- The inferred plate motion at the source location is also now indicated, and the distant stations used in the moment tensor inversion are marked with blue triangles.
- The bottom panel has had the station marker colours edited to be more visible, and two other events noted by the CTBTO (2015-08-25 and 2018-01-15) added, along with the corresponding moment tensors for the former (no robust solution could be derived for the latter). These two events are notable for being extremely close in location and magnitude to the 2024-10-05 event, illustrating that events like this are not unusual.
- The bottom panel continues to show both topography and fault lines, illustrating the compressional setting supporting reverse faulting.

Fig. 2:

- Although Fig. 2 is in and of itself unchanged, we illustrate the waveforms and corresponding variability in P/S ratios in Fig. S6.1-6.3 for three different, nearby events of similar magnitude. These show higher-than-expected P/S ratios but also significant variability, indicating that this is likely a feature of the region and its seismicity.
- These plots, coupled with the moment tensor inversions undertaken for the 2015-08-25 event, indicate that this event is not dissimilar to others occurring in the region over a period of many years.

Dear Dr Okuwaki,

Thanks for your further comments. This document outlines the changes that we have made.

In this document, and the tracked changes version of the paper,

Additions or revised text are in blue

Deletions or moved material are in red

Comments (in this response file only) are in orange.

Many thanks
Ben

Dr Benjamin Fernando

On behalf of the authors

1. # Distrbution of P/S ratios
   If my understanding is correct, I believe the relevant suggestion from Reviewer A is to recommend showing the distribution of P/S ratio, so that the readers could evaluate each value of the P/S ratio for the specific station and the specific event. For example in the revised Fig. S1.1, we have triangles that are showing the locations of the seismic stations. To show each value of P/S ratio at the station, one can plot the triangles by filling them with the color scaling with the P/S ratio, along with the corresponding colorbar on the side of the panel. Alternatively, one can plot histograms of the P/S ratio so that the readers could evaluate how the mean or median value of the P/S ratios can represent the distribution of the P/S ratios. In either the way, I would like to suggest showing the distribution of the P/S ratio, rather than only showing the representative value (e.g., mean), which can be applied to Figs. 2, S1.1, S1.2, and S1.3.

Apologies, we have now made this change using the editor's triangles idea. The relevant plots are in S. 1.1-1.4 (we have also added in a plot for the 2024-10-05 event that is the main topic of this paper).

2. # Additional moment tensor inversion
   I would appreciate it if the authors could clarify in the main text that the authors performed additional moment tensor inversion for the two events: mb 4.6 25 August 2015 and mb 4.4 15 January 2018 near the 2024 event by using the same procedure for the 2024 event, and only have the stable solution for the 2015 event (Fig. 1), which has the similar focal mechanism of the 2024 solution. Please also explain the possible reason in the main text why no robust solution has been derived for the 2018 event (e.g., due to relatively poor S/N ratio? or any conditions that did not satisfy the authors' quality control).

This has been added in the introduction:

Two earthquakes of very similar location and size to this event are an M 4.6 event on 2015-08-25 and another M 4.4 event on 2018-01-15. The moment tensors of these events were inverted for using the same GCMT methodology as described in Sec. 2.3; though a robust and stable solution was not possible for the 2018-01-15 event due to poor-signal-to-noise ratios.

And in the caption to Fig. 1:

whilst the 2015-08-25 event has a very similar focal mechanism to the 2024-10-05 event.

3. # Abstract
   It seems the Abstract section has been unchanged. I understand and appreciate the authors have added further clarifications in the main text of the revised version, but I am still wondering if these changes can also be made in the Abstract section, so that the

authors' analyses and findings are clearly explained in the Abstract section. Below I would like to echo the original reviewer's comments made during the previous round of review.

We have updated the abstract to reflect these suggestions (in both English and Persian):

The 2024-10-05 Iran M 4.5 earthquake took place at a time of heightened tensions in the Middle East. We perform a discrimination and moment tensor analysis and identify a shallow-dipping, reverse fault source commensurate with the compressional setting of the Iranian interior. However, the event's aftermath saw widespread dissemination of misinformation, and potentially active disinformation, concluding that it was in fact a test of an Iranian nuclear weapon. The ‘evidence' for many of these claims was based on inaccurate interpretation of seismic data. In this paper, we analyse how geophysical `fake news' propagated through social media (mainly Twitter/X) following this event, eventually gaining traction in mainstream, earned media. This event is nonetheless an illustrative warning of how seismic data can be misinterpreted and/or manipulated in public discourse.

4. I would like to ask the authors describing how the source mechanism is evaluated; for example, "we performed centroid moment tensor inversion using the regional waveforms to explore the source mechanism" and "we find the event is characterized by reverse faulting at shallow depth, which aligns with the surrounding tectonic setting."

We have edited Sec. 2.3 to be more explicit:

A moment-tensor inversion for this earthquake was carried out using the GCMT methodology of Ekström et al (2012) in order to determine the source mechanism. This inversion used 38 individual components from 22 unique seismic stations at global distance and was based on surface waves with periods longer than 40 s. The period band used was selected to optimise the inversion, given the lower magnitude of the source as compared to normal GCMT inversions.

This moment tensor is indicative of a shallow-dipping reverse-fault event, commensurate with the compressional setting of the Iranian interior (e.g. Tavakoli et al (1999))

5. I understand the earthquake happened in the particular timing and place of interest, but I would simply describe that the M 4.5 earthquake happened in Iran, potential misinformation propagated through social media (claiming the event was not a tectonic earthquake), and the seismological evidence and analyses suggest the event is likely an earthquake in Abstract section.

We have updated the abstract to reflect these suggestions (in both English and Persian):

The 2024-10-05 Iran M 4.5 earthquake took place at a time of heightened tensions in the Middle East. We perform a discrimination and moment tensor analysis and identify a shallow-dipping, reverse fault source commensurate with the compressional setting of the Iranian interior. However, the event's aftermath saw widespread dissemination of misinformation, and potentially active disinformation, concluding that it was in fact a test of an Iranian nuclear weapon. The ‘evidence' for many of these claims was based on inaccurate interpretation of seismic data. In this paper, we analyse how geophysical `fake news' propagated through social media (mainly Twitter/X) following this event, eventually gaining traction in mainstream, earned media. This event is nonetheless an illustrative warning of how seismic data can be misinterpreted and/or manipulated in public discourse.

6. # Sections
   I appreciate the authors have significantly reworked the contents so that they addressed the reviewers' comments. However, I may still find some sections can be merged or compressed in the light of the reviewers' suggestions. For example, I would like to suggest the following, which I greatly appreciate if the authors could consider and resolve accordingly. I believe this will only need a bit of re-arrangement of the texts and do not require significant changes.

(The line numbers I use below are from the ones in the clean version of the revised manuscript `clean.pdf`.)

1. Introduction
2. Data and Methods
2.1 Moment tensor inversion (L57–81)
2.2 Social media coverage (L101–124)
2.3 Earned media coverage (L277–286)
3. Results and discussion
3.1 Moment tensor inversion (L82–99)
3.2 Propagation of misinformation and disinformation (L126–324)
3.3 Suggested communication strategies (L325–368)
4. Conclusions

We have followed these suggestions almost exactly (with a couple of minor tweaks) and the report is now organised into four main sections rather than six. As per comments in response to other points raised by the reviewer, even more of the material has been transferred to the supplement. We would like to keep what remains in the main text there as we believe showing a thorough consideration of social media methods is important as well. We hope that the editor will be amenable to this as it is only around a page.

7. I would also feel that the sub-sections 4.3 and 4.4 (the numbers of the subsections refer to the ones in the `clean.pdf`) can be moved into the Supplementary materials.

We have moved these into Sec. S3.10.

8. # Fig. S1.2
   The title of Fig. S1.2A says "Mw4.4", but may I ask how the authors derived this moment magnitude? Or, Is it "mb 4.4" from the USGS catalog?
   https://earthquake.usgs.gov/earthquakes/eventpage/us2000cjnq/origin/detail

   The same question can be raised for Fig. S1.3A.
   https://earthquake.usgs.gov/earthquakes/eventpage/us7000npmi/executive

   Similarly, the title of Fig. S1.1A says "Mw4.6", but is this the one derived from the authors' own moment tensor inversion (not mb 4.6 from the USGS catalog)?
   https://earthquake.usgs.gov/earthquakes/eventpage/us100034tc/origin/detail

These are taken from the USGS catalogue, and we retain their reporting (wherein event titles are kept as “M”). We have clarified this in the supplement Sec. 1 though:

Magnitudes in figure titles are taken from the USGS catalogue, keeping the same naming convention (i.e. “M” in titles rather than mb or Mw, etc).

9. # Fig. S3.9
   Are there any particular reasons for using the different labels of the Y-axes: "(\mu m/s)" and "Vertical ground velocity"? If not, perhaps use the same labels for the Y-axes of both the panels as "(\mu m/s)"?

This was an axis labelling issue, we have made the change.

10. # Use of social media materials
    From what I checked through, it seems all the supplementary figures displayed in the original submission have been kept in the revised manuscript. Below, I would like to leave the relevant comment from the reviewer's report. I would very much appreciate it if the authors could consider these comments.

=
Figures S2.9 and S2.12 have already been presented in the publicly accessible websites that the authors referred to in the manuscript. For other supplementary materials (especially screen captures of the social media posts), I understand the use of such kinds of materials in Seismica is not for profit, so it should be fair use in that particular sense (also as the authors explained in the supplementary materials), but I would expect the supplementary tables, figures, and texts should be referenced by each in the main text (otherwise, these are not necessary I think). From these points of view, I suggest that the authors could consider reducing the number of the

display items in the supplementary materials if possible
=

As per the same reason above, I would think that below figures may not have to be presented if these are available in the publicly accessible websites.

Fig. S3.13: The corresponding figures are presented in https://www.bbc.com/news/world-asia-37582518

Fig. S3.14: The corresponding figure is presented in https://trendsinthenews.substack.com/p/nuclear-bomb-test-or-earthquake-in

Fig. S3.15: The corresponding figure is presented in https://www.ctbto.org/news-and-events/news/ctbto-detects-two-earthquakes-northern-iran-5-october

We have removed the following publicly viewable materials from the supplement and included links to the content instead. For the remaining items, we have added in direct references to each image/panel in the main text, and combined some to take up less space and removed others.

11. Data and code availability
    Please provide a code availability of the methodology (e.g., GCMT inversion) in the Data and code availability section.

We have added in that:

Details of the GCMT methodology can be found at https://www.globalcmt.org.

12. Fig. 1a,b
    The colour of blue for the stations looks a bit hard to recognise for me. Could it be possible to try another colour or using the black edge of the marker or making them bigger, so that they can be more recognisable.

This has been changed, the station triangles are now larger and outlined in black as well.

13. # Caption of Fig. 2
    These data are from regional seismometers that are
    -> These data are from regional seismometers (Fig. 1) that are

We have made this change:

These data are from regional seismometers (Fig. 1) that are not used in the GCMT surface wave inversion

14. # Figure labels
    Please use either the small or capital letter for the figure label consistently; a), b) for both Fig. 1 and Fig. 2.

This has been changed and capital letters are used throughout.

15. L81: source as compared to normal GCMT inversions
    -> source as compared to the one adopted in the regular GCMT procedure.

This change has been made:

The period band used was selected to optimise the inversion, given the lower magnitude of the source as compared to the one adopted in normal GCMT inversions.

16. # Conclusions (L424–447)
    I would recommend deleting line breaks at L425, L428, L432, L437, and L441.

We have removed these and the conclusions is now three paragraphs only.

17. # Abstract in Persian
    Thank you so much for providing the abstract in Persian. I will consult with the Copy Editing team if they could handle and resolve the relevant LaTeX issue after the formal acceptance.

Thanks!