Seismica review for A call from early-career Türkiye scientists: seismic resilience is only feasible with "earthquake culture"

Reviewer #1: Sara K. McBride, U.S. Geological Survey

Summary

This opinion piece explores and outlines critical actions that could be taken to reduce earthquake risk in Türkiye. The authors note that they are all from Türkiye and experienced the 1999 Ismet earthquake and thus have personal perspectives on these events.

What I liked about this article

This is a thoughtful and caring piece and one that I understand is deeply meaningful to the authors. I think it is important to have this in the literature.

What requires more consideration

One issue that may not be well considered yet is that none of the authors were living or experienced the earthquakes in 2023 at the time. Their experiences as children in 1999 are critical to their positionality but living outside that experience now makes them outsiders (with critical and important knowledge). An acknowledgement of this lack of firsthand experiences with the current earthquakes would be important somewhere in the text.

Further, there is no mention of working with social scientists to achieve these aims. These are all social issues and to understand these better, having good acknowledge and teamwork with social scientists would be useful for initiatives like these.

Relevant literature

Concepts on earthquake culture comes from social sciences and should be cited. Here are some relevant articles defining what this is and what the attributes are. Here are two that are helpful, particularly Mileti's foundational work on this topic:

Mileti, D. S., & Darlington, J. D. (1997). The role of searching in shaping reactions to earthquake risk information. Social Problems, 44(1), 89-103.

Webb, G. R. (2018). The cultural turn in disaster research: Understanding resilience and vulnerability through the lens of culture. Handbook of disaster research, 109-121.

Mileti, D. S., Cress, D. M., & Darlington, J. D. (2002, March). Earthquake culture and corporate action. In Sociological Forum (Vol. 17, pp. 161-180). Kluwer Academic Publishers-Plenum Publishers.

Suggestion For Recommendation 1:

This is excellent to encourage relevant geohazards education in formal settings but I also recommend looking at Free Choice Learning Environments and Museums. These are critical learning spaces in less formal environments where people gain a lot of knowledge about earthquakes. One citation is here:

Sumy, D. F., Jenkins, M. R., McBride, S. K., & de Groot, R. M. (2022). Typology development of earthquake displays in free-choice learning environments, to inform earthquake early warning education in the United States. International Journal of Disaster Risk Reduction, 73, 102802.

Suggestions for Recommendation 3:

Science communication is a critical skill that geoscientists can learn more about. There are a number of citations missing from this section on this topic and should be added to strengthen the authors arguments:

Dryhurst, S., Mulder, F., Dallo, I., Kerr, J. R., McBride, S. K., Fallou, L., & Becker, J. S. (2022). Fighting misinformation in seismology: Expert opinion on earthquake facts vs. fiction. Frontiers in Earth Science, 10, 937055.

Becker, J. S., Potter, S. H., McBride, S. K., Wein, A., Doyle, E. E. H., & Paton, D. (2019). When the earth doesn't stop shaking: How experiences over time influenced information needs, communication, and interpretation of aftershock information during the Canterbury Earthquake Sequence, New Zealand. International journal of disaster risk reduction, 34, 397-411.

Jenkins, M. R., McBride, S. K., Morgoch, M., & Smith, H. (2022). Considerations for creating equitable and inclusive communication campaigns associated with ShakeAlert, the earthquake early warning system for the West Coast of the USA. Disaster Prevention and Management: An International Journal, 31(1), 79-91.

McBride, S. K. (2018). Would you like people to listen to you? Be more likable!. Seismological Research Letters, 89(3), 1163-1164.

McBride, S. K., Llenos, A. L., Page, M. T., & van der Elst, N. (2020). # EarthquakeAdvisory: Exploring discourse between government officials, news media, and social media during the 2016 Bombay Beach Swarm. *Seismological Research Letters*, *91*(1), 438-451.

Note: many other publications exist and I encourage the authors to do their own searching. This is just a good place to start.

Also be mindful that there was science communication initiatives in Türkiye pre earthquakes. Citing these are important to acknowledge that work was and is ongoing in this area:

Ickert, J., & Stewart, I. S. (2016). Earthquake risk communication as dialogue–insights from a workshop in Istanbul's urban renewal neighbourhoods. Natural Hazards and Earth System Sciences, 16(5), 1157-1173.

Stewart, I. S., Ickert, J., & Lacassin, R. (2017). Communicating seismic risk: the geoethical challenges of a people-centred, participatory approach.

Overall, this had some very notable ideas and suggestions; I would recommend publication with minor revisions and additions to the literature.

Reviewer #2: Danielle F. Sumy, EarthScope Consortium

Dear Dr. Karasozen and co-authors,

Thank you for this opinion piece on the recent February 2023 Turkey doublet. I appreciate and respect how difficult this piece must have been to write, having first-hand knowledge of the earthquakes in Turkey and the 1999 Izmit sequence. I tried to provide objective advice below on how to strengthen the opinion manuscript, with the understanding that an opinion article is not at all objective.

Most of my comments are around additional citations for the paper and or a call for more description, such as around earthquake culture in the manuscript. My comments are very light.

Thank you,
Danielle Sumy, EarthScope Consortium
Handling Editor, Seismica

Abstract: In the abstract, Turkey is spelled this way, and then throughout, Türkiye. Just remain consistent throughout, unless you were provided different advice (e.g., Turkey in the abstract, Türkiye in the manuscript).

Line 18: simply say, ‘Geoscience should be integrated into the education system…’

Line 20: Geoscientists are not trained science communicators themselves, as much as we’d like to think we are. I think this comment could be strengthened by saying that ‘Geoscientists in collaboration with social scientists should prioritize science communication training…’ or something to that effect.

Lines 45-47: Are there references/citations to back this up, potentially including media sources?

Line 48: I would say ‘February 2023’ to be more specific.

Line 49: There’s a random ‘1’ in the middle of the sentence.

Line 53: Remove the word 'infamous'.

Line 65: Please provide a citation for the number of building collapse and the number of lives lost.

Line 70-71: Do you have a particular citation for this quote? I did a quick Google search and have found this quote in a lot of places.

Line 72: Please reference Figure 2 right after this first sentence, and then discuss the parts of it in the next sentence. I think this will help the reader.

Line 92: I think you'll need to define 'earthquake culture' here, especially because you include it in the title of the paper. I'd like to see a paragraph devoted here to 'earthquake culture', a term that I believe was pioneered by Dr. Dennis Mileti in the mid-1990s. For the readership of Seismica, I think this will be a new term, and deserves a couple of sentences about it. Then you can transition to the next sentence you write: "However, earthquake preparedness of the public is insufficient…' in the next paragraph.

Line 98-100: I'm wondering if DCHO should be referenced here. With the number of buildings that collapsed (e.g., pancake collapses and even buildings falling completely over), perhaps evacuation was the right thing to do in this instance. While DCHO is the recommended protective action in the United States, New Zealand, and other places (e.g., McBride et al., 2022 in Geophysics; https://library.seg.org/doi/10.1190/geo2021-0222.1 - which should be cited), I'm not sure that was the best course of action here. Is there a reference that Turkey advises to DCHO?

Line 102-103: This relates to the role of fatalism in earthquake preparedness. I think a couple of references here on fatalism, especially as it relates to Turkey and/or parts of Europe would be good to use.

Line 124: I'd also suggest citing the Bernard and Cooperdock, 2018 paper here (https://www.nature.com/articles/s41561-018-0116-6). In fact, they state that the geosciences is *the* least diverse of all STEM fields at all degree levels in the United States.

Line 125: Is there a citation about the scarcity of job opportunities in the geosciences in Turkey?

Line 140-141: I agree with this statement, and think it should be combined with people who know how to do this effectively already, such as social scientists who focus on communication. Perhaps, 'For this reason, we should prioritize learning from social scientists how to communicate…'

Line 150: ShakeOut should be in camel case.

Line 154: I appreciate the mention of sociologists here. Thank you!

Line 161: This is again why I think a definition is needed about earthquake culture, earlier in the manuscript. Earthquake culture has a meaning in the literature.

Lines 162-166: I appreciate your discussion on the role of museums and other free-choice learning environments in keeping the memory of past destructive earthquakes alive. In that vein, I'd suggest citing this article: Sumy et al., 2022, International Journal of Disaster Risk Reduction, https://www.sciencedirect.com/science/article/pii/S2212420922000218, as it highlights the Shake display that you discussed, as well as other museums and free-choice learning environments across the United States. I think this paper will help strengthen your argument here.

Line 168: A citation of the ruin would be good to have here. Also, a citation of the earthquake awareness week in Turkey would be helpful here too.

Line 173: 'citizen science' is something very specific and I don't think it's what you mean here. I would strike that phrasing ('but only with citizen science').