

Interactive comment on “Seismic Risk: The Biases of Earthquake Media Coverage” by Maud H. Devès et al.

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Dear Lisa Matthias,

First of all, we would like to thank you for your rigorous and thoughtful and constructive review. We answer point by point below. You can consult the details of the changes in the document entitled Devesetal_GC2019_revised_withtrackchanges. The final version of the revised manuscript, titled Devesetal_GC2019_revised, has been compiled by accepting all changes. It will be uploaded on the website.

We believe that the suggested changes have significantly improved the paper and we hope you will find it even more ready for publication, but we remain at your disposal for any further improvements you might find necessary. Thanks again for your help in

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dealing with this manuscript.

Sincerely,

Maud Devès on the behalf of all co-authors

— point by point response —

LM: "Dear Editors, Herein is my response to the manuscript entitled “Seismic Risk: The Biases of Earthquake Media Coverage”, by Maud H. Devès and colleagues to Geoscience Communication. The authors present an interesting piece about international news outlets’ reporting on earthquakes. I really like the figures as they nicely complement the paper – especially Figure 4, which visualizes and summarizes parts of the findings. However, I would suggest the authors describe in more detail the theoretical background of their paper, as well as their conceptual framework, and methodology. My relevant expertise for reviewing this paper is in framing research. Lines 72 – 77: The first paragraph could do with some more clarity and explanations: a) I would use “media coverage” when first mentioning the term, variations are fine afterward; b) Public opinion about what? Some references would be great too here to support your arguments; c) Social media and online press are two very distinct things. I am not sure why the authors are mentioning “social media” at all since the news outlets they examine later on are traditional online news outlets, not social media platforms like Facebook, Twitter, or Reddit; d) “One would expect”, who would expect, why would they expect this? The authors could draw on literature about the media’s role in society, for example. See, for example: Lasswell (1948), Wright (1960)."

Authors answer: now lines 72-79. a) We agreed and modified the text accordingly. b) c) and d) We modified the text to include the referee’ comments. Many substantial works have been published on the issue of the media’s role in society. We added a reference to a recent work by Harcup and O’Neill (2017). For the rest, we prefer mentioning studies more directly related to disaster risk reduction. We added two more references: one about the role of the media in influencing everyone representations

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about disasters; and another one, more operational, about the role of media in disaster risk reduction according to risk managers (Cottle, 2014 and Thanthathee et al., 2016). We still think it is important to mention social media and we hope the sentence placed at the very beginning of the paragraph will help clarify the focus of the paper from the outset. Newspapers are more and more influenced by the fact that the news they publish are further disseminated or shared on Twitter or Facebook but they remain the major gatekeepers in the process of news selection and dissemination (Harcup & O'Neill, 2017).

LM: "Lines 79 – 80: "Scientists often blame journalists," making such a strong and generalized claim, I would add at least (!) two more references. And perhaps consider a less aggressive turn of phrase for balance. Line 86: Please add a short explanation what is meant by "media filter." Lines 79-95: I like that this paragraph zooms in on geoscience research in the media, but it would be good to contextualize these findings within the wider media sphere and its practices. Since the authors focus on "international" media, it would be enough to focus on general characteristics of media, such as news values (while cautioning that taxonomies of news values cannot explain everything). See, for example: Harcup and O'Neill (2001), Harcup and O'Neill (2017), Wu (2000). When citing Harris' research, I am missing the explicit connection to framing research. For example, simplifying complex arguments is one of the very goals of framing, and so is the suggestion of a particular interpretation of events. Moreover, in this context, it is important to note that, depending on the country, science journalism is declining (Bauer et al., 2013), and that non-specialist reporters are now covering science-related news, and that this of course contributes to the kind of coverage (e.g., how detailed the report will explain the research) the reader gets. Line 93: Uncertainty about what?"

Authors answer: Lines 93-108. We reworked the paragraph in order to take into account the referee's comments.

We rephrased the first sentence and added one more reference to a paper about the

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I'Aquila trial (Cocco et al., 2015), an event that transformed deeply the relationship of the geoscience community to the press. We also added an explicit mention to the other papers discussed in the paragraph (we forgot to list them in the first sentence in the earlier version of the paper). Our idea in this paragraph is to show that media analysis is an important issue for geoscientists.

About the concept of 'media filter', we rephrased the sentence in order to make it clearer.

The referee is right when she says that the geoscientists we cite do not pay enough attention to the media rules and habits. But we did not want to add that discussion at the beginning of the paper as it might seem to technical to non-specialists. Again our idea here was really to show that media analysis (i.e. also understanding how the media work) is an important issue for geoscientists. We cut bits and pieces about Harris' work. Hopefully, it will make the argument clearer. The criteria of news selection formalized by Galtung & Ruge (1965) and further completed by Harcup & O'Neill (2001, 2017) indicates a clear preference of journalists for "bad news", "conflicts", "surprise" or "drama" and a clear rejection of "complex" stories, especially in the case of daily newspapers. In the case of online newspapers, the need to get clicks and shares has undoubtedly reinforced the influence of these factors in decisions about what news to select, as well as news treatment (Harcup & O'Neill, 2017). This might also explain why science journalism is declining (Bauer et al., 2013).

We meant scientific uncertainties and modified the sentence to make it more explicit.

LM: "Lines 97 – 107: I think this paragraph would actually fit much better right after the first (after line 77), if "Things, however, have proven to be more complex." was deleted, the text would also flow much more nicely. How the authors structure their text is of course up to them, but as a reader I was hoping for an explanation and/or some examples regarding the media's influence on public opinion and action in this context. I would find it easier to follow the manuscript if related paragraphs would be grouped

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together, and my mind would not have to jump between topics and then back. Line 105 – 106: Direct implications for what? What agencies?"

Authors answer: Lines 81-91. We agree with the referee's suggestion. We moved the paragraph and reworked the text accordingly, deleting notably the unhappy sentence: "Things, however, have proven to be more complex".

About agencies, we meant any agencies involved in disaster risk reduction. We modified the sentence as follows: "how [the] agencies [involved in disaster risk reduction] could reduce fatalism and facilitate preventive action by the way they present information about earthquakes and other disasters."

LM: "Lines 109 – 125: The relevance of this paragraph for the current paper should be highlighted."

Authors answer: We removed the paragraph.

LM: "Lines 127 – 161: Personally, I find this section difficult to follow. It is titled "This study," yet only 17 lines are about this study. I am missing explicit research questions and hypotheses, something that explains how the authors are approaching their overarching research question "in a globalized world, can we find systematic trends in how the international press covers earthquake events?"

Authors answer: Lines 110-179. We have modified the title of the section 1.2. to be more consistent with its content and attempted to formulate more clearly our research question. In a previous paper (Le Texier et al. 2016), we showed that the coverage of earthquakes in international news published by daily newspapers concentrated on a limited number of events due to differences in the geophysical, geographical and political contexts of the different earthquakes and demonstrated a strong homogeneity in the editorial selection process. This study really aims to look into the temporal dynamics of the coverage (duration, trends) and into the potential existence of a typical framing of 'earthquake news' (i.e. by comparing news content between events and

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between newspapers from various countries and languages).

LM: "Lines 147 – 148: a) The authors write "the different laws postulated by Galtung," but then cite Koopmans & Vliegenthart, 2010: Why not cite the original article? b) However, I am unsure why this is mentioned as the authors do not analyze, nor connect their findings to, the level of newsworthiness according to Galtung's taxonomy c) If I have missed the connection between Galtung and the authors' findings, there have been, at least, two notable "updates" on Galtung's work, which might be worth considering, Harcup and O'Neill (2001) and Harcup and O'Neill (2017)."

Authors answer: Lines 160-163. We modified the sentences as follow: "It is thus possible to analyze the level of newsworthiness according to the general laws postulated by Galtung and its followers (Galtung & Ruge, 1965; Harcup & O'Neill, 2001, 2017; Wu, 2000) and their specific application to earthquake media coverage (Koopmans & Vliegenthart, 2010)."

LM: "Line 168: Could the authors please define "the international press" in the context of their paper, and also give a more detailed explanation for the selection of news outlets? In particular, I would argue that some news sources chosen for this paper do not necessarily constitute as international news outlets, depending on how the term is defined: Vancouver Sun (looking at the circulation, it even becomes difficult to say this is a national newspaper), The Star, LA Times, El Informador. Likewise, it would be helpful to explain why these news sources were chosen over others that are arguably more relevant "international" news outlets (e.g., CNN, the BBC, Al Jazeera). Moreover, I would be interested to know why the authors included the Financial Times. While this is certainly an international news source, its focus is on business and economics. Line 173: How did the authors assess "media quality?" What were the inclusion and exclusion criteria for RSS feed regularity, the geographical location of the news outlet, and volume? Why did the authors not include website traffic/news circulation in their source selection criteria? Line 175: It would be good if the authors could elaborate on "sufficiently homogeneous:" What are the similarities, and where do the selected

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sources differ?"

Authors answer: Lines 184-198. We added an explicit definition of what we call "international news" at the very beginning of section 1.2 (lines 143-145). It states: "The current paper focusses on 'international news'. By 'international news', we mean news published by daily newspapers about foreign countries or, in practical terms, news published by newspapers through a specific RSS flows entitled "international" or "world". We have systematically replaced "international press" by "international news published by daily newspapers" or, in abbreviate form, by "international news".

The details of the criteria used to build the media corpus are discussed in the supplementary of Grasland (2019). We added the reference that we forgot in the earlier version in the presentation of the datasets. It can be consulted here: https://journals.sagepub.com/doi/suppl/10.1177/1748048518825091/suppl_file/Supplements

The term of "media quality" has been replaced by "national or international status of newspapers (broadsheet newspapers)". We removed "sufficiently homogeneous" from the sentence. The newspapers entering the database are newspapers with important audience in their home country that play an important role in the importation of foreign news from the rest of the world. Some broadsheet newspapers have also been selected for their global audience (e.g. Financial Times).

LM: "Lines 168 – 169: Please briefly explain what data the geophysical set contains and how it was selected."

Authors answer: Lines 184-198. For the geophysical database, we use the seismic catalogue provided by the USGS. The USGS collects and analyses data recorded by several networks of seismographs throughout the world. It maintains an online catalogue of archives called ANSS (Advanced National Seismic System) Comprehensive Catalog. This is, to date, the most exhaustive database freely accessible to the general public. The catalog is accessible here: <https://earthquake.usgs.gov/earthquakes/>. It is well-known by geoscientists and we were not sure it would be necessary to develop

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much further in the main text but we added a sentence for the sake of clarity: "The geophysical dataset is built from the online seismic catalogue provided by the United States Geological Survey (ANSS). For each earthquake, we collect the following parameters: hypocenter, magnitude and label."

The ANSS catalogue offers access to the main parameters that allow geophysicists to characterize earthquakes. Among these, the parameters we have retained for comparison with the media database are the following: The hypocenter localizes the seismic source in terms of latitude, longitude, and depth. The magnitude measures the energy liberated by the earthquake. In other terms, it is the measure of its objective "physical importance". However, there are different ways to estimate the magnitude of an event and different types of magnitude can follow each other over time. The USGS catalog prefers the moment magnitude (Mw). For recent periods, such as the one used in this study, the magnitude indicated in the database is therefore in theory a moment magnitude. Should the USGS send press releases immediately after receiving the preliminary data for seismic events of magnitudes over 6, the event's magnitude is generally re-evaluated with the arrival of additional data. Therefore, the press mentions different magnitudes for the same event. The label offers the geographic localization of the event with two different parameters. One is a political (country, region) or geographic (continent, sea, ocean) variable. The other is a spatial variable of distance and orientation in terms of the nearest population center with over 1,000 inhabitants within a radius of 300 kilometers. Though they may seem redundant with the precise geographic coordinates of latitude and longitude, these variables are extremely important in terms of the media since they offer the earthquake not only a position but also a nationality and a location allowing the public to name and memorize it. We will see that there is confusion as several earthquakes (e.g. main shock and aftershocks) are defined as different events by Earth scientists but are often conflated from a political and media standpoint.

LM: "Line 169: The acronym "USGS" should be spelled out when used the first time."

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Authors answer: It has been done. See line 187.

LM: "Line 183: Please add (n=X) for items that were excluded because they were void of relevant information? The authors should also state how many items they started out with, before the cleaning and tagging. Lines 187 – 188: Please add how many duplicates were removed."

Authors answer: All numbers are indicated in Figure 2. We do not find necessary to repeat the information but we can if the referee finds it necessary.

LM: "Line 190: What software did the authors use for the tagging process?"

Authors answer: The software R was used for all the analyses. We used notably the package tm for text analysis. We added a sentence at the end of section 2.1 (lines 197-198).

LM: "Line 193: Is the dictionary available somewhere?"

Authors answer: We tagged news related to earthquakes using the following dictionary. Error rates are given in the paper lines (217-218). They are reasonably small (4% for false positives, 2 to 3% for false negatives).

word type TAG language aftershock disaster_name Earthquake en aftershocks disaster_name Earthquake en tremor disaster_name Earthquake en temblors disaster_name Earthquake en seismic disaster_name Earthquake en seismicity disaster_name Earthquake en seism disaster_name Earthquake en seisms disaster_name Earthquake en tremor disaster_name Earthquake en tremors disaster_name Earthquake en tsunami disaster_name Earthquake en tsunamis disaster_name Earthquake en quake disaster_name Earthquake en quakes disaster_name Earthquake en earthquake disaster_name Earthquake en earthquakes disaster_name Earthquake en terremoto disaster_name Earthquake es terremotos disaster_name Earthquake es temblor de tierra disaster_name Earthquake es temblores de tierra disaster_name Earthquake es sismo disaster_name Earthquake es sismos disaster_name Earthquake es

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seísmo disaster_name Earthquake es seísmos disaster_name Earthquake es sismico disaster_name Earthquake es sismica disaster_name Earthquake es sismicidad disaster_name Earthquake es tsunami disaster_name Earthquake es tsunamis disaster_name Earthquake es maremoto disaster_name Earthquake es maremotos disaster_name Earthquake es aftershock disaster_name Earthquake es aftershocks disaster_name Earthquake es temblor disaster_name Earthquake es temblores disaster_name Earthquake es tremblements de terre disaster_name Earthquake fr tremblement de terre disaster_name Earthquake fr séisme disaster_name Earthquake fr séismes disaster_name Earthquake fr sismique disaster_name Earthquake fr sismiques disaster_name Earthquake fr tsunami disaster_name Earthquake fr tsunamis disaster_name Earthquake fr aftershock disaster_name Earthquake fr aftershocks disaster_name Earthquake fr

We believe that as the response to referees will be available online, there is no need to add this table in the paper (it is a bit long and boring to read). But we will follow the reviewers' advices on the subject.

The country dictionary used in the paper is available on request at claude.grasland@parisgeo.cnrs.fr. It is specific to the year 2015 (names of state representatives, etc.) and limited to three languages (FR, EN, SP). A less precise but more polyvalent dictionary can also be found in the R package newsmap by Kohei Watanabe: <https://github.com/koheiw/newsmap>.

LM: "Line 230-232: Critical discourse analysis does not just analyze texts but relates the content and its meaning to underlying structures of the sociopolitical context. This is also being done in Cox et al. (2008), which the authors say "inspired" their methodology. For the context of this paper, it might be better to not use the term as this is not what is done."

Authors answer: Line 252. We removed the reference to "critical discourse analysis".

LM: "Line 235: "As we are dealing with hundreds of thousands of items": In line 198,

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the authors write "4411," so this seems like a slight exaggeration. (see comment to line 544)"

Authors answer: Line 254. By Án hundreds of thousands items Âž we refered to the total EQmedia database. But we agree with the referee that this can introduce some misunderstanding as the detection of "textual silences" and key words has only been done on the 4441 items mentioning earthquakes. We modified the text accordingly.

LM: "Lines 244 – 256: I like that the authors briefly and clearly describe the individual categories."

Authors answer: Thanks iAŁ

LM: "Line 270: Please briefly explain those limitations."

Authors answer: Lines 292-293. We added explanations in section 2.3. There are limitations to the keyword approach: the meaning of isolated words is often ambiguous and related to the context and the position before or after other words (Church & Hanks, 1990). But the independent classification of the items by the coauthors indicates a good consistency in the coding of themes and subthemes and the identification of topics (we reach a maximum of 12% of differences for the emergency response category). More details on how to improve our "bags of words" approach are provided in the final discussion of the paper.

LM: "Line 390 – 391: Since the authors write "centers," which other regional centers have been referred to?"

Authors answer: Line 413. The sentence was unfortunate. We reformulated it as follows: national meteorological agencies and emergency operations centers, etc.

LM: "Line 419: What do the authors mean by "romanticized?"

Authors answer: We deleted Án the event starts to be romanticized Âž as we were not sure of the translation from French to English... We meant: "being embedded into a

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story (often partly imaginary)".

LM: "Lines 476 – 477: This is really interesting, and it would be great if the authors could add a few quotes."

Authors answer: Lines 499-505. We added two quotes for illustration.

LM: "Line 484: Could the authors either explain further, or delete, "that one could call topoi?"

Authors answer: Agreed and done.

LM: "Lines 490 – 492: This is really interesting! Is this the same across all news outlets (i.e., do all, or a great proportion of, news outlets cover these topics for the Nepal earthquake?)? Why do the authors think this is?"

Authors answer: The most important difference in terms of news content seems to be linked to the duration of coverage. The coverage of the Nepal quake lasts longer, and news are richer.

LM: "Lines 521 – 522: Do the authors think that this might have been different if they had looked at news outlets from the countries the earthquakes were located in?"

Authors answer: We focused on international news and cannot answer directly to the question. But we know proximity does matter. This is suggested by the case of the Times of India which has the largest and longer coverage of the Nepal quake.

LM: "Line 544 (Figure 5): This might relate to my confusion in line 235, what does "items" refer to here? It seems that the authors are using it for different purposes (i.e., news items and ?)?"

Authors answer: The referee is right. We use sometimes "news items", "items" or "news". All these versions actually mean the same. We have corrected the text and the figures accordingly.

LM: "Lines 553 – 554: Do the authors have any idea why? Since these are foreign news outlets, referring to celebrities could increase the newsworthiness of the reports?!"

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Authors answer: Lines 580-582. We agree with the referee. It confirms classical rules of news value about elite people and celebrities formulated by Galtung and Rudge (1965) and Harcup and O'Neill (2001, 2017). We added a sentence spelling out that point.

LM: "Lines 574 – 576: Again, I wonder if this might be different with local news outlets (i.e., the country affected by the earthquake) because "issues of recovery, restoration, reconstruction, adaptation, mitigation and preparedness" might seem somewhat more relevant to those countries than to faraway places, especially those that do not experience earthquakes."

Authors answer: A very good point, but out of the scope of the current paper.

Please also note the supplement to this comment:

<https://www.geosci-commun-discuss.net/gc-2019-5/gc-2019-5-AC2-supplement.pdf>

Interactive comment on Geosci. Commun. Discuss., <https://doi.org/10.5194/gc-2019-5>, 2019.