

Response to two reviewers' comments (2nd round)

Droughts and Media: when and what do the newspapers talk about the droughts in England?

Comments from the Editor

One of the original reviewers was available and they have reviewed the manuscript based on the comments of all the 3 original reviewers. The authors indeed put in lots efforts to address the comments and improve the manuscript. And I also thank authors for their open and welcoming attitude towards the reviews.

In this round of review, a new reviewer was also invited from industry background, who raised a number of questions for authors to think about. I would like to invite the authors to address these comments, especially in the discussion of their paper. This can give authors an opportunity to see how a practitioner view/read their paper.

We would like to thank both the editor and two reviewers for the comments on our paper. We are happy to see that our previous revisions have been appreciated and have now further revised the manuscript as requested. These minor revisions on the one hand address the specific suggestions made by Referee #2 and on the other attempt to clarify some of the points from the new referee (Referee #4) with an industry background. Additionally, we have made minor changes only to an extent to improve the readability of the manuscript.

Referee #2

General Comments:

After reading through the authors responses, they put in a lot of effort to address the feedback from all three reviewers. They addressed all my comments from the first round. Furthermore, their new statistical analysis combined with drought indices adds more nuance to the study's original findings, which is a great to see.

Thanks a lot for taking the time to look at our paper again and for your positive and constructive feedback. We are really pleased that you like the increased nuance of the paper's findings.

I had one lingering general comment that is described in more detail in my line comments below. Briefly, I'd like the authors to add more discussion on whether/how the interpretation of their results may differ if they are to choose one of the more parsimonious models in Table S1.

We address this point, and the others, in the specific line edits.

Based on my general comment and the handful of line edits below, I recommend this manuscript be accepted with minor revisions. Thanks again to the authors for their interdisciplinary approach to looking at drought through the lens of newspaper media. I found the paper very interesting and am grateful for the opportunity to serve as a reviewer.

Many thanks.

Line Edits

Line 139. I suggest removing the word “package” as, from my reading, the authors are referring to the entirety of the R software, not a specific R package. The final sentence would then read: “The process was performed in R, version 4.3.2...”

Thanks, you are right, we replaced this as “R Studio version 4.3.2”.

Lines 153-159. Pointing out that this text is all underlined because I’m not sure if that was intentional. I do not think the underline is needed.

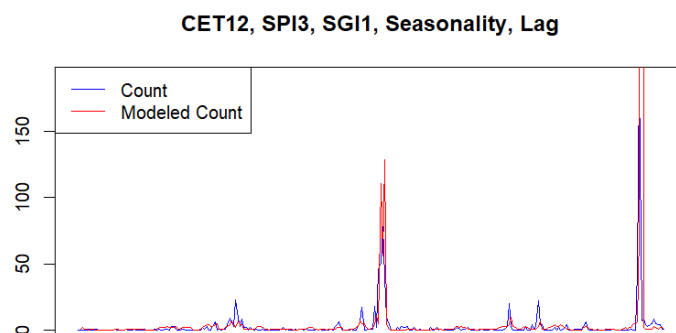
This underlining was to highlight some changes, we have removed it now. Thanks for pointing it out.

Line 178-179. Can the authors please provide a sentence explaining what R package they used to do the negative binomial regression analysis and cite the package? I believe it’s, the MASS R package, correct?

Correct. We have specified this in the paper and added a reference to the package (“...find the best-fitting model using the MASS package in R (Venables & Ripley, 2002).”). This also addresses a point made by Reviewer #4 (see below).

Line 180. If AIC values are within two units of one another, they are not (statistically) significantly different. As a result, it’s typical to choose the most parsimonious of the models tested within the two-unit difference. That said, I recommend the authors consider whether/how the findings of their work may differ if they were to use, for example, the model with only SPI12 and seasonality (Table S1 row 3). I’d like to see more discussion of this in the results section. It would also be great to include a third line for that model on Figure S2, if that helps to show the comparison in performance.

Thanks for pointing this out. We have added plots of two of the more parsimonious models to Figure S2 and discussed these results briefly in the results.



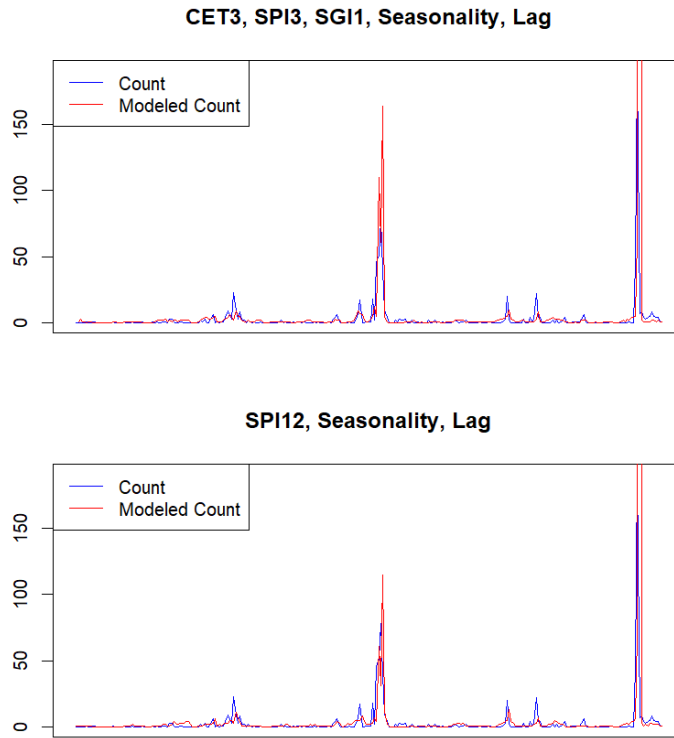


Figure S1 Comparisons between actual article counts (blue) and modelled article counts (red) for three best models

In this study, the best model with the smallest AIC was to use CET-12, SPI-3, SG-I, and Seasonality, and the lag effect of the media (top), the second-best model to use CET-3, SPI-3, SGI-1, Seasonality, and the lag effect (middle), and the third best model, and the most parsimonious one, to use SPI-12, Seasonality, and the lag effect (bottom). Since their AICs differ by only a couple digits (please refer to Table S1), we concluded that it is reasonable to explain the most parsimonious model (bottom), as well as the best model (top). As a result, we elaborated on this point with an updated Table 1.

Table 1 Statistical results of negative binomial regression models: the best AIC model and the parsimonious model (p -values: ‘***’ < 0.001, ‘**’ < 0.01, ‘*’ < 0.05, ‘.’ < 0.1)

| Variables | The best AIC model | | Parsimonious, yet 3 rd best model | |
|-------------------------------------|-----------------------|--|--|--|
| | Best-fitting variable | Negative binomial coefficient (p-values) | Best-fitting variable | Negative binomial coefficient (p-values) |
| Temperature | CET-12 | 0.395 (.) | - | - |
| Precipitation | SPI-3 | -0.415 (***) | SPI-12 | -0.835 (***) |
| Groundwater | SGI-1 | -0.868 (***) | - | - |
| Seasonality (Autumn as baseline) | To include | Winter | To include | Winter |
| | | Spring | | Spring |
| | | Summer | | Summer |
| Lagging effect of media attention | To include | 0.046 (**) | To include | 0.050 (**) |
| Intercept | | -0.736 (**) | | -0.528 (*) |

Lines 383-386. I think this point is very interesting and appreciate the authors adding this discussion of nuance here and in the abstract.

Thanks for this - we're glad that this helped.

Table 1. I appreciate the authors including this table with the R model outputs and their interpretations, but I recommend they move this level of detail to the supplement.

We agree to this point. We relocated the descriptive notes about the results, including coefficients and statistical significance, in the manuscript. In addition, according to your suggestion, we looked into the parsimonious model (i.e., the model with the third lowest AIC), which allowed us to make a comparison about negative binomial coefficients between the best model and the parsimonious model.

Figure 2. Overall, this is an interesting visual! I wanted to point out that I do not see a lilac-colored grid on the top; it looks grey in the attached PDF. Since there is no color scale bar given, I recommend the author's explicitly give a description in the caption that lighter hue saturation indicate higher article counts and hydroclimatic anomalies (either larger negative or positive) whereas darker hue saturation indicate the opposite.

Thanks for picking this up - the grid is in fact now in grayscale. We have modified the caption to refer to grayscale and indicate that saturated hues refer to drought-prone anomalies.

Table S1. Is there a way for the authors to include R squared or something similar in this table that would give a sense of how much variation in article counts each model explains?

We use the glm function from the MASS package from R, which by design doesn't output (pseudo) r^2 values. We took up your other suggestions, and plotted the modelled distributions in Figure S2 as you suggested above.

Referee #4

Explaining the statistics to choose the binomial distribution. The R code shows that the author did run tests to determine the distribution and statistically should be explained for scientific validity.

We are working with count data, which are not normally distributed. Therefore we used a negative binomial model as discussed in the methods (L165), which is appropriate to non-normal, highly skewed data.

The research does draw into question the relevance of this issue, as the media uptake of drought conditions should reflect the authority's response. Regardless of what words are used to find what articles are relevant to how reported droughts are aligned with the scientific community, the accuracy of when they are reported, if not completely false or not completely misaligned by time period or scientifically accurate, is not a major determining factor of what the response to droughts should be.

The aim of our paper was to explore how the media report droughts. We don't claim that media reporting **should** influence the response to droughts. As we explained in the introduction (L50) media reporting "influences public perception and societal responses" (e.g. to restrictions) which in turn influence the effectiveness of policy responses. We have edited the text in the introduction to make this point clearer.

Social media is an unaddressed component of news during 2022 and was not addressed extensively. This is a main difference between the reporting between the main years chosen with significant droughts. This is a limitation for the data explored in 2022. Has this been catered for in the code for the binomial regression for the 2022 drought?

Although social media have been the subject of great interest, our paper uses newspaper reporting as a source. As we explained in the discussion, using only a single genre of reporting is a limitation and we recognise that including “social media could provide valuable additional perspectives” (L464).

This paper may be deemed a media analysis, not of scientific literature. The climactic factors during a particular time period are important. However, in terms of when the droughts are reported in the media, this has not been referenced within the scientific literature. Are there regulatory obligations? How should this be applied to current events?

We are not quite sure what is meant here, but it is indeed the case that one could study the genre of scientific papers as a different source. In this study, we focused on newspapers as a key arena for mass communication, which reflects the bi-directional relationships both from the government/authority and the public.

With respect to regulatory obligations about the reporting of droughts in the UK, there are none as far as we are aware, since the UK has a free press with very limited restrictions on reporting except with respect to national security issues (Wilkinson, 2009).

Wilkinson, N. J. (2009). *Secrecy and the media: the official history of the United Kingdom's D-notice system*. Routledge.