**Response to reviewers:**

**R2**

Comment1:

No fundamental flaws but two weakspots in the argument to be solved:  
  
Authors clearly describe why OA publishing can be beneficial for climate change research, however does not become clear why OA publishing comes with benefits specific to climate change research (i.e. benefits not true for other areas) [can be solved by not overstating this argument and simply clarifying that OA is beneficial to climate change research (along other areas)]  
  
Unexplained (or unsatisfactorily explained) discrepancy btw. the argument that OA publishing would improve public uptake but evidence shows that political uptake is higher for closed research

#Response to R2 - C1:

Thank you for providing these helpful comments. We have revised our manuscript to improve the structure and our message for OA publications. We have highlighted specific reasons for why OA is critical for climate change research.

Our analysis of citation and new/policy mention data has been revised to include more papers and journals (our threshold cutoff was lowered to 100 papers, which results in a doubling of journals included in our analysis). With these changes, political uptake is clearly higher for closed research, especially for very-high impact journals (Fig. 2d). We explain that these documents are often created by international organizations (i.e. United Nations) and cite the most publicized articles, i.e. closed-access high impact journals that receive much more media attention. Despite this, we argue that OA is still important as local management and policy (not as well captured in Altmetrics) depend on smaller local-scale studies, which are often published in lower-impact journals and receive far less publicity.

Comment 2:

Authors provide evidence for the connection btw. the mode of publication (open / closed) and societal impact, based on their analyis of publicly avaliable data, which can be considered a useful and interesting contribution to the debate on the role of OA and Open Data in climate change research.  
  
Two weakspots in the argument need to be solved (see review comment under Q2)  
  
The structure of the paper should be revised as it inconsistently mixes conclusion /opinion, with the evidence for the opinion being only disclosed at the very end: proposed structure: part (1) - main line of arguments to be explored, part (2) evidence / data analysis (incl. figures), part (3) conclusions / recommendations (incl. table 1)  
  
Argument in Line 130/131 that tackling climate change in time will require rapid collaborative efforts, would be excellent entry point for the whole paper / intro section  
  
The argument that OA climate change research can have a greater societal impact among non-academic audiences should be substantiated with more then just one evidence / reference (Cvitanivic), as otherwise the evidence seems rather anecdotic)

#Response to R2 - C2:

As stated in our Response to Comment 1, we have restructured our manuscript to improve clarity and our message to readers.

Regarding support for OA research to have a greater societal impact, we have included additional references for support.

**R3**

Comment 1:

Tai and Robinson make important points how wider adoption of open science practices could improve both the research process and the dissemination of results.  
  
Comments on how the manuscript could be improved below:  
  
Title: "Transforming" is probably too strong, as the manuscript doesn't detail how full adoption would completely "transform" climate research, "Improving" or "Enhancing" or similar might be more appropriate.  
  
# L. 57  
  
Here some discussion of the Journal Rank used would be useful. A citation seems to be missing:  
  
SCImago, (n.d.). SJR — SCImago Journal & Country Rank [Portal]. Retrieved Date you Retrieve, from http://www.scimagojr.com  
  
As Altmetric is used as an alternative to citation based metrics some discussion of Impact Factors (see e.g. discussion in https://doi.org/10.1101/062109) might also be appropriate.  
  
# L. 86  
  
https://doi.org/10.7554/eLife.32822 and https://doi.org/10.1126/science.352.6285.508 provide further evidence on journal access needs in the developing world.  
  
# L. 105  
  
"have successfully implemented open data climate science" - this is explained a bit in the next sentence, but could maybe worded differently, something like "share research results in open data archives"  
  
# L. 108  
  
The potential inadequacy of Journal policies might be worth discussing here (https://doi.org/10.1073/pnas.1708290115). Funders (e.g. in Horizon 2020) have also set up open access requirements.  
  
# Table 1  
  
The table doesn't seem to be referenced in the main text.  
The last row could add EarthArXiv (https://eartharxiv.org/) as well.  
  
# Figure 1  
  
The choice of 200 total citations would need to be justified. It could also be appropriate to pick an average publication rate, as newer journals might be otherwise left out.  
  
E.g. Searching for "climat\* change" in Abstracts in Earth System Dynamics https://www.earth-syst-dynam.net/search.html?abstract=climat\*%20change  
yields 198 results in 2010-2016 alone.  
  
Also, Geoscientific Model Development returns 491 search results for abstract "climat\* change" in 2008-2016 but doesn't show up in the list of journals in the dataset.  
https://www.geosci-model-dev.net/search.html?abstract=climat\*%20change  
  
Newer paywalled journals like Nature Sustainability or Nature Energy might also be included if a different threshold or metric to select journals were selected.  
  
# Figure 2  
  
The y-label needs clarification ("Mean #")  
  
# Code and Data availability  
  
The code used for the analysis should be archived together with the data in a suitable archive, e.g. Zenodo which provides simple integration with GitHub (https://guides.github.com/activities/citable-code/)  
  
The repository at https://github.com/travistai2/open-science-cc seems to miss the actual article data.  
  
Some more description on how to reproduce the analysis and figures in the Readme would be helpful.  
  
The code makes reference to a local directory structure which might not be reproduced after cloning the repo. Adjusting these to relative paths (if possible) would be helpful.  
  
This line seems to have some whitespace issues: https://github.com/travistai2/open-science-cc/blob/master/scripts/Scopus\_models.R#L44  
  
# References  
  
A few references are websites (e.g. Obama, McSweeney), here providing a link, access date and/or alternative archive link (http://archive.org/) would be helpful. For the McSweeney reference it might be useful to document the relevant data points in the accompanying data, as some results appear only in an image in the Carbonbrief article

Responses to R3

#Title

Thank you for the suggestion. We have altered the title.

#L57

We have added in the citation in our references for SCImago. We have also included a description of the SCImago Journal Rankings and the use of these rankings in our analysis. We also describe the breakdown of our Journal Rank bins (from low to very high).

#L86

Thank you for providing these references. We have included a statement regarding the demand for scientific literature, as indicated by pirating websites (i.e. Sci-Hub)

#L105

We have changed our wording accordingly.

#L108

We agree that most journal OA policies are inadequate and we have incorporated this into the discussion.

#Table 1

We have referenced Table 1 in our manuscript.

#Figure 1

Thank your for this comment. First, we want to clarify our criteria for journal selection. Our analysis selected journals from the Scopus database based on the number of total articles published within each journal with the “climat\* change” search criterion; thus we did not select articles based on number of citations. We revised our threshold cut off to >100 to include more journals, such as the ones you mentioned, and updated the analysis and figures. Our revised threshold number approximately doubled the number of journals included in our analysis from 116 to 225. Our results have changed slightly, which we have incorporated into our discussion. However, our message and the support from this data for our message remains the same.

#Figure 2

We have changed the axis label to improve clarity.

#Code and data availability

Data used in this analysis is kept behind a subscription. We have contacted Scopus and Altmetric to request permission to publish the data that we used in this analysis. If they approve, we will make the data available via GitHub.

#References