

Peer Review Report

Review Report on Reproducibility in subsurface geoscience

Original Research, Earth Sci. Syst. Soc.

Reviewer: CLARE E BOND

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EVALUATION

Q 1 Please summarize the main findings of the study.

The study reports the findings of a questionnaire on the reproducibility of results in geoscience

Q 2 Please highlight the limitations and strengths.

The study is short and to the point. The figures are presented well.

I found the introduction to the study poorly structured with unclear paragraph construction.

I feel that the restructuring of this section to providing a clearer narrative will result in a much better and more impactful paper.

I was disappointed to see that despite this paper calling for reproducibility in methods and minimisation of biases this was not discussed for their own methods, and the qualitative data referred to is not available. This is discussed under question 3 below.

Referencing seems limited with the option for (e.g. single paper) rather than discussion in detail of a greater breadth of supporting literature which would have added weight to the study.

I feel that some discussion or separation of quantitative data (e.g. experimental derived results of analyses) versus qualitative data/analysis (e.g. interpretation) would have really helped to provide context to the particular challenges that geoscience faces.

Q 3 Please comment on the methods, results and data interpretation. If there are any objective errors, or if the conclusions are not supported, you should detail your concerns.

The study focus is on reproducibility including methods, results and open science/transparency.

I was therefore disappointed to see that despite this paper calling for reproducibility in methods and minimisation of biases, that the methods section is short and does not seem to consider biases that may have been introduced in the the questionnaire methodology. The data provided in the supplementary material does not include open comments, despite these being referred to in the results. There has been no coding of comments (qualitative data) and this data is not available in the repository so it is not possible to assess if the comments quoted in the text and used to support ascertains are representative of all survey respondents, or reflective of the majority, or are a sole voice. As this is the tenet of the paper I would have expected best practice in both analysis of qualitative data and data availability.

Q 4 Check List

Is the English language of sufficient quality?

Yes.

Is the quality of the figures and tables satisfactory?

Yes.

Does the reference list cover the relevant literature adequately and in an unbiased manner?

No.

Are the statistical methods valid and correctly applied? (e.g. sample size, choice of test)

Yes.

If relevant, are the methods sufficiently documented to allow replication studies?

No.

Are the data underlying the study available in either the article, supplement, or deposited in a repository? (Sequence/expression data, protein/molecule characterizations, annotations, and taxonomy data are required to be deposited in public repositories prior to publication)

No.

Does the study adhere to ethical standards including ethics committee approval and consent procedure?

Yes.

If relevant, have standard biosecurity and institutional safety procedures been adhered to?

No answer given.

Q 5 Please provide your detailed review report to the editor and authors (including any comments on the Q4 Check List):

I was really excited to read this study and I think it is a worthy topic for study and discussion. I however found it quite hard to read and I really feel like greater clarity in the narrative through a more focused paragraph construction will help the paper achieve maximum impact, particularly in the introduction. I also feel like there are issues that should have been considered and raised in the introduction and literature cited that would have informed this text. For example the idea of geology as an interpretative science as discussed eloquently by Frodeman (1995) and the impact this has on reproducibility in the subject. The paragraph construction in places left me to not understand the relevance of what appeared to be key points e.g. the impact of the 'consensus method' on reproducibility. Or what the consensus method is, and if it is an established term?

The methods section is short, which may seem appropriate for a paper that is based on analysing a questionnaire, but the paper makes distinct points about data access, data analysis and bias in both methods and results; and their impact on reproducibility. No consideration is given in the paper to these issues for the methods used. e.g. An example questionnaire is not available so the format of the questions is not apparent. Were the participants given choices to rank? what were the choices and ranks in each case? Could they provide free comments to all questions, or just at the end of the questionnaire? Where are these free comments – they are not provided in the supplementary material, but they are referred to in the paper to support interpretations/ascertains. There is no way for the reader to check if the quotes used and ascertains made are voice of one individual or the majority.

Was coding undertaken of the qualitative data, if not why not? If so what methods were used?

Are the questionnaire data biased by the use of leading questions? How were the questions and ranks developed/tested in advance of the questionnaire deployment?

It would be useful to, as a minimum, discuss these points and any actions taken, for example to minimise response bias, to include an example questionnaire, the text of the free comments. Discussion of why you chose the ranks and approach you did.

The paper purports at the end to make suggestions for improvement. It would be great if these were summarised. I do not see how the text in the box relates to the paper, or its purpose. You attempt to put the importance of reproducibility to the delivery of the SDGs and energy transition focused geoscience, to fit ES3 and I like this spin, but I feel it is currently poorly argued, hopefully you can make these points stronger in a restructured narrative.

I have added an annotated PDF with some specific comments in the text that reflect those made here including some literature suggestions.

I would like to reiterate my starting point that I think this is an important study, worthy of discussion, but I think you can make a much more robust and impactful paper with better narrative and framing and consideration of the implications of your own methods and full disclosure of all the data referred to in the body of the paper. I would be happy to be contacted about any of the points raised.

QUALITY ASSESSMENT

Q 6 → Originality	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Q 7 → Rigor	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q 8 → Significance to the field	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Q 9 → Interest to a general audience	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Q 10 → Quality of the writing	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q 11 → Overall quality of the study	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

REVISION LEVEL

Q 12 → What is the level of revision required based on your comments:

Substantial revisions.