

## Peer Review Report

# Review Report on Three Horizons for Future Geoscience

Perspective, Earth Sci. Syst. Soc.

Reviewer: Maeve Boland

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### EVALUATION

#### **Q 1** Please summarize the findings and viewpoint reported.

The authors set out a stimulating idea with the goal of provoking debate and perhaps driving change in the relationship between geology / geoscience and society. The authors use Bill Sharpe's "Three Horizons" approach to identify Horizon 1, Business as Usual, where geology is driven by economic growth, Horizon 2, an entrepreneurial pathway driven by the energy transition, and a radical visionary Horizon 3 driven by human wellbeing. The authors suggest that social concerns should be at the "front and centre of the geological mission" but note that others may favour other scenarios for the future of geoscience.

#### **Q 2** Please highlight the limitations and strengths.

Limitations:

The Cape Town Declaration is the "Declaration of the 10th World Science Forum on Science for Social Justice". This focus on "Science for Social Justice" in the Declaration and as the foundation for this paper should be made more explicit at the start of the paper.

The authors appear to view geology/geoscience as a very utilitarian pursuit dedicated to economic growth. While this is true of much applied geoscience, it is a rather limited view of the science as a whole. Geological concepts such as deep time and evolution have also had large societal impact, including on the social sciences and humanities. It would be helpful to clarify the boundaries of this paper and its focus on applied geoscience.

The authors should explore the difference, if any, that they see between "geology" and "geoscience". "Geology" is used much more frequently in relation to Horizon 1 and "geoscience" is used more frequently in discussing Horizon 3. Is there any significance in this use of language? Is one more closely related to study of "rocks" and the other to the Earth system, or how do the authors distinguish between the terms?

Strengths:

The paper offers a welcome invitation to critically examine the societal context and the assumptions that underlie the teaching and practice of geoscience and the real and perceived contributions of geoscience to society.

The "Three Horizons" concept and diagram are an excellent vehicle for conveying the ideas expressed in the paper in a way that geoscientists are likely to relate to easily and that can form the basis for discussions.

#### **Q 3** Please comment on the reported results and data interpretation. If there are any objective errors or fundamental flaws, you should please detail your concerns.

This submission is a perspective or opinion piece rather than a traditional scientific paper therefore the standards for proof of conclusions are somewhat different. The authors present conclusions and opinions that are based on a combination of evidence and values, which is appropriate in this context.

**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?

Yes.

If the manuscript includes original data, are the applied methods accurate and comprehensively described?

Not Applicable.

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

Not Applicable.

Are the data underlying the study available in either the article, supplement, or deposited in a repository?

Not Applicable.

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

Yes.

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

As noted above, I suggest clarifying that the Declaration and paper focus on the interface between (geo)science and social justice, that the focus is on applied geology/geoscience, and paying more attention to the use of "geology" and "geoscience" throughout.

Lines 155–158: While the health impacts from anthropogenic activities clearly do include the environmental impacts of mineral and petroleum operations, there are many other threats to health from geoscience-related anthropogenic activities. Agriculture and waste disposal, to name just two Earth-related human activities, have immense impacts on water and soil quality and thus affect health.

Line 169: Missing an "l" in real-world.

Reference list: Add the Declaration of the 10th World Science Forum on Science for Social Justice to the list.

**QUALITY ASSESSMENT**

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