

Dear referee,

Many thanks for the time you have taken reading and commenting on this submission. Both reviews we have received are incredibly constructive and informative and we deeply appreciate the effort that has been put into them. We generally agree with the feedback and suggestions made in both reviews. We do feel that some of the suggestions are out of scope for this manuscript and its intended audience (people with no background to decolonising and similar concepts who are from a discipline heavily divorced from its human and social impact). This manuscript is designed as an introductory piece, and we understand that it often skirts around some complex arguments and concepts – and may feel lacking in depth to those who are familiar with the topics and concepts covered. Several of the suggestions made are things some of the authors (and other groups in the geosciences) are working towards and that we hope will be outputs in their own right. Reading these reviews has been hugely interesting and insightful, again we extend our thanks to the reviewers, hopefully our paths may cross again as we work towards a more inclusive, accessible and decolonised geology! In order to make our response more focused we have provided comment (in red) directly to each point:

Dear Author(s),

I enjoyed reading this article and appreciated the politics that lead you to write this work. In particular, your call to make accessible to the STEM community (and very specifically Geologists) the importance of “decolonizing the curriculum” is noteworthy. You organize the article well and set out to outline how the field of Geology is deeply grounded in colonized knowledge production mechanisms, and the impact this continues to have on the current field. You focus on the ‘decolonizing the curriculum’ as a site from which you can imagine a new field – that it cognizant of its history, but also willing to make the change required to ensure that the knowledge produced is inclusive, accessible, and diverse. This seems quite laudable goals, and you end your writing with concrete ways in which the field of geology (with sustained efforts by current practicing and teaching geologists) can change. You provide 10 concrete ways to do this (with also a focus on climate justice as part of the 10 points suggested). The writing ends with a glossary, which I think non-specialists will find particularly useful.

While this is a well-intentioned article and writing, I’m afraid it also has a few vital flaws, which I outline below as way to possible encourage the author(s) to rethink/rewrite/reframe this writing.

1. A collapse between decolonial/post-colonial/anti-colonial frameworks – This seems like a vital issue with your writing. Decolonizing as a political term comes from a long legacy of Indigenous scholars working to ensure that Indigenous knowledge

and ways of knowing are recognized as vital ways of organizing our world – BUT it is also vitally about the land on which settlers live and thrive (including the University). Decolonizing work is then different from scholars who do post-colonial work and scholarship. While you cite Tuck and Young (Decolonization is not a metaphor), there is no engagement with his scholarship – nor an attempt to resolve how decolonizing the curriculum engages with the larger politics of decolonization and IS NOT a metaphor (or is it?). A non-critical engagement with ‘decolonizing the curriculum’ is another form of privilege that you as authors need to interrogate – and then build your own analysis from for your future facing geology projects.

We have tried to frame this paper specifically around Decolonising the Curriculum as this is an initiative many academics are being asked/encouraged to engage with but don't understand what it is. We completely acknowledge that the depth and rigor of the framing of Decolonial/post-colonial /anti-colonial frameworks is not what may be necessarily expected in a manuscript exploring these topics (particularly by scholars who are familiar with the topics!) – the manuscript is written to be an “entry” guide into Decolonising the Curriculum for geologists, which explains the outline concepts (with some historical context/examples/why it matters included), highlights false narratives (e.g. removal or “cancelling” of content/individuals) and importantly emphasises the human element of the discipline. Talking about decolonisation as a (e.g.) metaphor (or not) would potentially disengage readers and reinforce the (anecdotally at least) prominent thinking amongst many geologists that decolonisation is “something for the Humanities”.

2. Please remember, that diversity is NOT decolonization. I recommend a few bits of easy reading to help clarify this vital point in your writing:
3. <http://www.criticalethnicstudiesjournal.org/blog/2019/1/21/do-not-decolonize-if-you-are-not-decolonizing-alternate-language-to-navigate-desires-for-progressive-academia-6y5sg>
4. <https://speakingofmedicine.plos.org/2021/07/29/its-time-to-decolonize-the-decolonization-movement/>
5. <https://aninjusticemag.com/its-not-decolonize-it-s-desupremify-9b6e9ea02aae>

We understand this and do not intend to suggest that diversity = decolonisation. We have highlighted that diversification of materials (etc.) is NOT decolonising the Curriculum (and why).

Point 7 of our suggestions does specifically call for diverse geologists. This is because geology (particularly postgraduate level) has a huge diversity problem, dominated by white men. This structure is colonial and inherent of the current disciplines colonial origin. We acknowledge that diversifying geology doesn't necessarily equate to decolonisation, but a diverse set of voices are needed to shape any decolonisation of the discipline.

6. Open your article with the ways geology existed in pre-colonial/indigenous knowledge spaces: Currently in your writing, the structure situates “geology” proper as a science, as a field of knowledge – as a way of knowing the world. While you acknowledge this ‘formation’ came about because of colonization, you reinforce this privileging of ‘Science’ with a capital S by situating it above localized knowledge(s). Even as you set to situate Geology, you begin by citing Nicholas Steno. I recommend moving up section 4.2 first, and then outlining the ways geological knowledge existed in certain locations – and what colonization did to erasures of these knowledge(s) and ways of knowing the world. In your own writing, highlight the erasures and violence of colonization. This ensures that the scholars who read your work are willing to recognize explicitly the violence of their academic ancestors, and understand that geological knowledge existed long before it was formalized within and through colonial science (as an aside, you can critically engage with the science must fall framework – I do not sign up for that entirely, but it goes help me think through some vital points critically).

We have structured the manuscript in the order it is in to ensure readers recognise the discipline that they “know” and can then introduce how/why it is colonial – then moving on to examples of what some of these structures are. We feel that many of the scholars we are trying to engage with would likely disengage if erasure and violence of the discipline was upfront and explicit (no matter how true it is). We wholly agree that a detailed and honest account of pre-colonial and Indigenous geology is required, with an account of how this has been erased/stolen. To this end several of the authors of this manuscript, along with historians, and decolonial scholars have successfully applied for (some modest) funding to begin pursuing this. This is the logical next stage of resources aimed at geologists to continue highlighting the colonial past/present of the discipline but requires additional outputs.

7. Of the 10 recommendations you have for your field, point 7 is about the diversity of scholars in the field. However, at no point do you engage with a systematic analysis of how many Indigenous scholars are Indigenous – either in your own universities, nationally, or within the leading Geology organizations. Is there no research on this – and if not, perhaps that is a gap you can address. Inclusion in ‘teams’ can sometimes be tokenistic. However, mapping out how many professors of Geology are Indigenous scholars or how many recent hires are Indigenous junior scholars might be a concrete way to highlight how the field of Geology continues to be a settler colonial field – with ongoing violence both on the lands of the people on which the research is done and where it is taught (i.e. the physical space the Universities stand on).

Several of the authors are part of a group of geologists who are actively working to increase the inclusivity, accessibility and diversity of geology – it is all too clear that geological academia in the Global North is massively white and male. We are not aware of any data on how many geology scholars are

Indigenous scholars but looking at “general” diversity statistics would indicate not many are – it is certainly a colonial field of study (particularly once postgrad levels are reached). We will emphasise the importance of working with, and alongside, Indigenous scholars and populations. In geology there are many colonial, inclusivity, accessibility and diversity issues, we need to ensure that the burden of work to remove these barriers does not fall heavily upon those who have been historically marginalised and/or had their knowledge erased or stolen (which is one of the reasons for writing this sort of manuscript).

8. Situate yourself within this writing: This might be harder for you to do, as in the STEM fields we still want to believe in the ideas of ‘objective’ knowledge – when, our best bet is to work with ‘situated knowledges.’ Sandra Harding’s work is truly helpful in this framing and given that you already draw on their work – I would encourage you to develop this a bit more (there is a recent sage research chapter on Sandra Harding’s work would work well for your STEM audiences). It would be helpful for the readers to know how many of you are Indigenous scholars, and the experiences you may have within the field of geology. Also, maybe concretely outlining how you bring your ancestral knowledge to bear on ‘traditional’ geology curriculums.

We can explore a way to introduce the authors backgrounds and experiences – however this needs to be thought about carefully, we know that there are individuals openly hostile to the ideas of decolonising the geology curriculum (amongst other problematic issues the discipline has) and would not wish to provide any information that could lead to harassment.

In conclusion, I commend the authors for this work and encourage them to consider re-framing this article, so it sets out to fulfil its own political goals. I’d also encourage them to work closely with Indigenous scholars (which is different from working with/in diverse research teams). In your conclusion, you beautifully remind your readers that geologists need to remember that “[...] work we conduct is not apolitical, neutral, nor divorced from society – people, places, knowledge, power and the environment are interwoven with our science.” Yes, indeed!!!

A pleasure to engage with this work and I wish the authors well in their pursuit to shape Geology for the next generation.

Again – many thanks for this review. We appreciate that the manuscript does not wholly delve into many of the colonial issues in geology, or fully introduce the epistemicide that lays the foundations for the present canon of the discipline. These are important, and we need to work towards these goals. This manuscript could be seen as one of the first steps into introducing the disciplines problematic past and present, decolonisation, and Decolonising the Curriculum, to a discipline of scholars who for the most part are unaware (or unwilling to except) the human impact of geology.