Earth System Music: the methodology and reach of music generated from the United Kingdom Earth System Model (UKESM1) –
By de Mora et al. (2020)

I reviewed and posted my referee comment in the interactive discussion of the earlier version of this manuscript on March 5, 2020. The authors have addressed most of my comments, and the revised version is more concise and readable. I particularly like the edits done to fig 1 and fig 2 as well as the text revisions in section 3.1 (Works) which make the content more accessible to non-musicians. My comments related to the current version of this manuscript are shown below. I have two main comments; comment #1 requires major revisions (and is preferred):

1. **Evaluation Strategy (Major revision) -** This study has three main goals: (1) to turn data into music, (2) to show standard practices in climate modelling, and (3) to quantify the dissemination of musical pieces. The manuscript addresses the first two goals well, but (as stated in my earlier comments) it does not include a systematic and robust analysis that is needed for tackling goal 3. The collection and analysis of data from YouTube's channel's monitoring toolkit (the way it is done in the manuscript) are not enough to effectively quantify their reach, even for a pilot study like this. To me, this evaluation strategy appears to be an afterthought, and can be significantly improved to make the results more interesting and meaningful to the readers.

Therefore, I suggest one of the followings:

(A) Focus the manuscript on goal 1 and 2. Skip goal 3. This would make this manuscript a method-focused paper.

(B) Include goal 3. This will require additional work (1-3 months). I realize that the current pandemic imposes limits on how much work can be done at the moment. However, using online surveys/interviews could still be a very good option to collect dissemination data. One idea would be for the authors to start collecting data on video usage from Earth sciences students and/or Earth sciences community including EGU/AGU members. Survey questions could focus on whether or not each video meets its objectives. These objectives should be clearly defined in the paper.

My impression is that much of the underlying practices in climate modelling is unfamiliar even to Earth scientists / students – therefore, if the videos cannot reach Earth scientists unfamiliar with climate modelling, it would be very hard to reach the general public. Therefore, testing these videos with the Earth sciences community could be a very good step in that direction.

2. **Paper Reorganization** - The 6 musical pieces and videos are currently described in the methods section. I suggest moving section 3.1 (and all the subsections: 3.1.1 - 3.1.6) to the results section because the videos are the final products (i.e. results) of the methods described in section 2. Then remove what is currently in the results section (i.e. evaluation data which is not the strength of this paper) to the discussion section under a new subheading (e.g., video assessment).

Below, I have listed some minor edits:

Minor edits:

1. Line 142: change "which" to "with"

2. Throughout manuscript, change "data is" to "data are"

3. Perhaps consider combining figure 2 and 3.

4. Consider deleting the two logos from figure 1. They're unnecessary.

5. Delete line 210 – unnecessary sentence: "While the method is relatively straightforward and repeatable" and start the paragraph with "Each piece has a diverse …"

6. Delete lines 258-259 – unnecessary sentence: "As this was the first piece in the series, this seemed an appropriate way to start the Earth System Music project."

7. Sometimes the authors use "fig" or "figure" in the text to refer to figures. Please pick one and keep it consistent throughout the manuscript.

8. References section – it would be great if the actual YouTube links can be added either in the manuscript or in the reference section so the readers can look them up. For examples, the following two references contain no links:

Line 705: de Mora, L.: Lee de Mora's YouTube channel homepage, 2019.
Line 738: Reddit: Data is beautiful sub-reddit., 2019.

9. Line 254: delete the extra "is" in "The SSP1 1.9 projection is ~~is~~ the future scenario in…"

10. Line 271 – I think a verb is missing from this sentence: "In this piece, the Drake Passage current is set to the C major scale, but the other three parts module between the C major, G major, A minor and F major chords." Or are you using "module" as a verb?

11. Line 298 - "The first scenario..." instead of "The three scenarios"

12. Define SSP somewhere in the text.

13. Line 299: delete the extra "apostrophe" in "business as usual"'

14. Line 325 - remove the extra "be"

15. Line 334: I think you mean "ocean surface" as opposed to "surface ocean"

16. Line 339 - Change "our" to "scientific" in "outside our community"

17. Line 358: Change "criterion were" to "criterion was"

18. Line 388: delete the second "and"

19. Line 406 – There are some minor grammatical errors in this sentence: "YouTube's built-in toolkit for channel monitoring, YouTube studio, was used "to" quantify the reach, "audience" engagement for the individual videos, as well as the entire channel (Google, 2019)."

20. In addition to comment 19, I suggest to delete "audience engagement" all together unless you consider clicking and maybe viewing a video a meaningful form of engagement. This study mainly assesses the number of viewers as opposed to evaluating audience engagement.

21. Line 407: "Using these tools…" I think you mean "using this tool…."

22. Lines 408-409: In regards to this sentence: "This is because YouTube studio can only produce reliable data on unique viewers for a period up to 90 days." Any idea why? Readers would be interested in this. Please elaborate.

23. Line 410: If a person watches the same video from the same device multiple times, is this counted only as one view or multiple views. Not clear from the sentence.

24. Line 448-454: This entire paragraph reads like a figure caption/legend. I suggest deleting it and adding it to the figure caption.

25. Line 503: "they" not "the" in "…they included a wide range of…"

26. Out of curiosity – are there good references for evaluating YouTube videos using the YouTube monitoring toolkit? Can you reference them? For example, in line 557, the authors state "We have found that the YouTube studio toolkit is not currently sufficiently capable to fully quantify the reach of these videos." Are there other studies making the same claim? And if so, what kind of changes are needed to improve the toolkit?

27. I highly recommend remove "social media statements" from the manuscript main text as they don't add much to the manuscript. Alternatively, include them as supplementary material. Same goes for paragraph 546-551.

28. Paragraph 525 - Change the start sentence to "The total number of views of the Earth System music playlist is comparable with other videos on Earth System 525 modelling."

29. Line 561 – The authors state that "it is not possible to determine whether the audience learned anything about Earth System modelling using the metrics provided by YouTube studio or the comments posted on social media." – This shows that the evaluation strategy was not successful in assessing "learning" and/or "engagement". But this should have been clear from early stages of this study. Again, the evaluation section of this paper is weak, and can be significantly improved using other methods.

30. Line 563 – Just because the work is a pilot study, it doesn't mean that one should not assess its effectiveness robustly especially if the assessment is set as a goal of the study. I suggest revising this sentence.

31. Line 592 – Revise sentence "we were not able to vary ~~to~~ the instruments used"

32. Line 594 – "In addition, each dataset ~~within~~ in a given piece was…"

33. Line 549 – "…it has been advised…" not "it's been advised"

34. The caption for Table 1 appears to be wrong.

35. In the supplementary materials (zip file), two music sheets appear to be missing.