Editor comment: Thank you very much for addressing the points raised in the previous review. I also accept that you do not want to go into much more detail regarding GWP*. However, could you please clarify the question about the usage of alpha (from Cain/Lee) to ensure full reproducibility and traceability to the references?

Author reply to Editor comment:

We appreciate the comment about the need for improved clarity surrounding our usage of the weighting factor "alpha" in our last revision where we had elected to accommodate the reviewer's suggestion (pasted below for convenience) to assess whether better agreement with ΔT ("Delta T") could be achieved when applying the modified GWP* expression presented as Eq. 1 in Lee et al., 2020. Because we had used the notation "alpha" extensively throughout our manuscript to denote the surface albedo, we elected instead to use the original "s" notation of Cain et al., 2019 (the original presentation of the modified GWP* expression) to avoid confusion.

We decided to reproduce Eq. 1 of Lee et al. 2020 for the reader's convenience, now appearing as new equation "10" in our newly revised manuscript. We now state explicitly in the main text and in Fig. 7's caption that Figures 7 B-D are based on this equation, and that the "alpha" and "s" terms used in Lee et al. 2019 and Cain et al. 2020 have identical interpretations.

Reviewer comment, previous review:

Section 6:
The equation for GWP* in Lee et al is the version from Cain et al (2019), but Lee et al say that (what they call) alpha is assumed to be zero for their case. Where you apply GWP* in fig 7, as you have a full time series, I think you can assume that alpha is not zero. You could then use the full equation which accounts for the average RF over the period Delta-t. As this accounts for the slower climate response to past changes to RF, perhaps GWP* will have better agreement to Delta T in fig 7b. The equation in Cain et al tried to improve on the Allen et al 2018 equation to have a better agreement with temperature, so it may do so in your example and I think it's worth testing. If that isn't possible, then I think you need to say that you haven't used the extra term in Cain et al (and why) and discuss whether you think it would improve the agreement with temperature (or not). You may also want to then amend your discussion around line 581 related to GWP*.

Author reply to Reviewer comment, previous review:

OK, we have invested notable effort here to demonstrating the faithfulness by which the GWP* approach reproduces the temperature response (revised Figure 7) for a range of time step sizes ("Delta-t") and "alpha" factors applied to the same widely divergent RF scenarios as used in the previous version of Figure 7 A. Although not easy, we believe we have been able to strike a good balance between adding new content which serves to further elevate the manuscript's scientific value while maintaining an orderly and logical flow. We feel that any additional elaboration on the GWP* measure at this point would begin to extend well beyond the current manuscript scoping.