



EGUsphere, referee comment RC1
<https://doi.org/10.5194/egusphere-2022-1024-RC1>, 2022
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Comment on egusphere-2022-1024

Anonymous Referee #1

Referee comment on "TIMBER v0.1: a conceptual framework for emulating temperature responses to tree cover change" by Shruti Nath et al., EGU sphere,
<https://doi.org/10.5194/egusphere-2022-1024-RC1>, 2022

General comments:

This manuscript describes an emulation of earth system model output, specific to the biogeophysical responses to forest cover change. Afforestation, reforestation, and reference scenarios are used to assess the model's representation of change in air temperature at and 2 metres above the land surface. The emulator appears to perform well against MPI-ESM, but substantial errors accumulate for extreme afforestation and deforestation scenarios in the other models and against observations.

The research topic is an important and relevant one, as the computational complexity of ESMs increases, as does the importance of assessing and planning land-based climate mitigation responses. The study is well-designed and clearly argued and the manuscript is well-structured and thorough. Overall I would recommend its publication with minor revisions.

Specific comments:

What about anything other than surface and 2m air temperature? At least acknowledge its limitations as a metric for all "biophysical" climate impacts (e.g. that it conflates albedo- and latent heat-related surface temperature changes despite their quite different effects on the atmospheric energy balance).

There is no mention of tree species/PFT and how the variation in tree types around the world influences biophysical properties in different biomes. Since tree PFT likely accounts for a major part of the variance of biophysical properties in the ESMs, I would have liked to know how this was translated to the emulator.

The figure captions should fully define all acronyms and variable names. It should not be necessary to read the text in detail to gain a basic understanding of what the figures show.

Technical corrections:

L5: usage: suggest "accounting for them" to replace "their accountance"

L9 and L413: usage: suggest removing "agilely", which does not feel like a natural word, and its meaning is communicated later in the sentence already (with "by means of a computationally inexpensive manner")

L57: usage: suggest "hereafter" to replace "hereon"

L59: typo: "biobphysical"