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Geoscientific Model Development editorial board Berlin, 25th May 2023

Final Submission: TIMBER v0.1: conceptual framework for emulating temperature responses to tree cover change

Dear Dr. Müller,

We are pleased to submit the final version of the model description paper for TIMBER v0.1. Following the final external reviews we also corrected some typing errors and further improved the discussion surrounding TIMBER v0.1 in Section 5. These are delineated in the following page. Otherwise, we are certain that the text has reached a good state and would like to thank you and the external reviewers for your efforts. We hope that the reader base of GMD enjoy the text!

Yours Sincerely,

Shruti Nath

(on behalf of all co-authors)

1) L117-L118 we refer specifically to which impact model corresponds to which SSP scenario:

In this study, we use the trajectories of tree cover changes according to these two scemarios-SSP 1-2.6 and SSP 3-7.0 as modelled by the Integrated Assessment Models, IMAGE and MESSAGE-GLOBIOM respectively

2) L224:

In this study, we use the Hooker et al. (2018) a model adapted from Hooker et al. (2018) to...

3) L366 we replaced struggle with underperform:

Given that \Gamma m may struggle underperform

- 4) L444, we had misstyped \Delta TS^{max}_{m,s}, it should be \Delta TS^{min/max} $\{m,s\}$
- 5) L540: we agreed to remove the discussion on spin up period as it would not necessarily account for all initial starting condition effects
- 6) L564: we removed discussion on PREMU as this would also require representation of non-local effects of tree cover changes, which currently are not fully understood.