

## Response to Reviewers – GMD-2023-146 (revision 1)

We are happy that the Editor and both Reviewers were satisfied with the revised version of the manuscript. The remaining technical corrections have been carried out. The authors would like to thank both Reviewers and the Editor for their insightful comments during the review process.

### Reviewer #1

The authors did a great job in a) answering all my previous comments in detail and b) revising the manuscript accordingly.

- *Excellent! Thank you again for the good and constructive feedback for improving the paper.*

Pending the following technical correction, I recommend publication of the paper:

Figure 10b: please correct color for FSM scenarios

- *Thank you for noting the color difference between the figure and the legend. This has now been corrected.*

### Reviewer #2

Can the authors double check the forestry production data from FAO in Figure 10? The quantities seem about 50% of what I see reported in FAOSTAT.

- *Apologies, the figure caption's descriptor for the data was slightly misleading. (This was stated in the correct way in the main text.) The presented FAO statistics and model results represent industrial roundwood harvests, although the text stated 'Roundwood harvests'. The difference is that the former does not include wood fuel, but only sawlogs, pulpwood and other industrial roundwood. This has now been corrected to the figure caption and the y-axis.*

Also the right panel includes a gray series that isn't listed in the legend.

- *Thank you. Reviewer #1 also noted the color difference between the figure and the legend. This has now been corrected.*

Also, in lines 596-599, I wasn't suggesting (in round 1 review) that an IAM paired with CLASH should turn off its simple climate model's CO2 fertilization response. I was just asking if this model was designed to replace that function in a pairing. Because it is not (at least at this stage of development), the IAMs should not turn off the CO2 fertilization function, unless a team is interested to devise a method whereby the terrestrial CO2 flux would be estimated from the CLASH outputs. For revised text, I'd suggest:

"However, in such a pairing, note that there would likely be a discrepancy between the CO2 fertilization function in the IAM's simple climate model, and the CO2 fluxes represented structurally by CLASH. Future researchers may seek to replace the CO2 fertilization function in the simple climate model with the relevant outputs from CLASH, in order to improve the simple climate model's estimates of CO2 concentrations."

- *Thank you for clarifying the comment in the first round of reviews. We modified the suggested text a bit further, arriving at (including also here the paragraph's first sentence): "If the IAM has a built-in climate module, it can provide the future CO2 concentration and temperature change for the CLASH ecological module, while CLASH can calculate the net carbon exchange of terrestrial ecosystems. However, in such a setup, it is important to note a likely discrepancy between the climate module's carbon cycle and the carbon stocks represented by CLASH. Particularly, the climate module should not represent the carbon exchange between atmosphere and terrestrial ecosystems, as CLASH accounts for terrestrial carbon stocks and the fertilization effect from elevated CO2 concentrations. Further model development might be needed to replace relevant parts of the IAM climate module (or an external simple climate model) with associated outputs from CLASH to ensure consistency between the two parts."*