Author's response to editor comment (third round):

"Isoprene and monoterpene simulations using the chemistry-climate model EMAC (v2.55) with interactive vegetation from LPJ-GUESS (v4.0)"

by Ryan Vella et al.

We thank all editors for checking the revised manuscript and for the feedback provided. Here, the editor's comment (from December 23, 2022) is reproduced in black, while our comments are presented in blue.

From the editor's response:

Your revised manuscript is better to read now but our previous comments are fully satisfied. Please revise your manuscript several things more to improve readability.

1. Fig.1 helps what is done in this study and we more request that this manuscript give proper credit to Forrest et al. (2020). It is quite useful to add a sentence to describe that this study extends Forrest et al. (2020) by adding LAD for the BVOC emission simulations.

Manuscript was updated accordingly. Now it reads "This study focus on BVOC model processes in EMAC based on interactive vegetation from LPJ-GUESS. It extends on the model coupling between EMAC and LPJ-GUESS in Forrest et al. (2020) by employing new parameterisations to calculate the foliar density and leaf area density distribution from vegetation states in LPJ-GUESS." (L. 142)

2. To avoid misleading, please also add a sentence to clearly describe that the process-based model in the LPJ-GUESS is not coupled into the ESM

This is now mentioned several times:

Fig. 1 and 2 captions.

L. 127: "BVOC emissions from this module are only calculated within the LPJ-GUESS model part and are not integrated into or transferred to EMAC at the current stage."

Now it reads (L. 127): "**Semi-process-based** BVOC emissions from **the LPJ-GUESS module** are only calculated within the LPJ-GUESS model part and are not integrated into or transferred to EMAC at the current stage."

L. 147: "The semi-process-based BVOC emissions from LPJ-GUESS are not integrated into EMAC and are only evaluated against the new vegetation-sensitive empirical-based emissions fluxes in EMAC."

3. It is confusing to mention the process-based model in the LPJ-GUESS in the manuscript (especially in introduction) because this study uses empirical models of ONEMIS and MEGAN.

Agreed. Process-based model descriptions from the introduction were removed. They are now briefly mentioned in Section 3.2 where semi-processed-based emissions from LPJ-GUESS are compared to empirical-based emissions from ONEMIS and MEGAN in EMAC with interactive vegetation.

Also, I am not sure if the intercomparison of ONEMIS and MEGAN with the offline LPJ-GUESS provides differences between them only and not-quite-useful statements to mention other works.

The section comparing ONEMIS and MEGAN emissions with LPJ-GUESS emissions was amended with such considerations.

3. LAD, LAI and vegetation cover fraction show seasonal variations but figure captions do not provide any information on their timing. Also figure captions are not self-describing which makes us difficult to read.

The temporal (monthly) variability for LAI is show in Fig.5 panel (e) and discussed in L. 248. The monthly variabilities of the LAD and fractional converge are now discussed in L. 270 and L. 276, respectively.

All figure captions were revised making them self-describing.

4. It will be also good if this study mentions previous intercomparison studies between empirical and process-based models and their implications in this study.

This is now discussed in Section 3.2 "BVOC emissions from LPJ-GUESS" (L. 362-378).

Further modifications:

Fig. 2 was updated and now specifies that emissions in EMAC are only empirical-based and process-based emission from LPJ-GUESS are only used for comparison. The new vegetation variables derived in this study are now shown in red.

The Levis et al. (2003) study was moved from Section 3.3 to the Conclusions section.

Besides these comments, some text in the manuscript was modified to improve readability.