Reply to comments from Referee #1

This study utilized 10 monoterpenes and 10 sesquiterpenes, which are commonly emitted from vegetation, to evaluate the reactive and adsorptive losses of volatile organic compounds inside the enclosure using dynamic headspace sampling approaches. In addition, two deuterium-labeled compounds were used to assess whether they could serve as internal standards for evaluating reactive and adsorptive losses of terpenoids during in situ field measurements. Overall, this study is well-written and provide valuable insights into for designing field-based volatile measurement systems to miminize adsorptive and reactive losses. I have a few minor comments that should to be addressed in the revision.

1. It is unclear how the deuterium-labeled compounds were quantified using GC-MS. A detailed description of the quantification method should be provided either in the M&M section or in the supplementary document.

Reply: The deuterium-labeled compounds, α-pinene-d3 and β-caryophyllene-d2, were quantified using their characteristic m/z 96 for α-pinene-d3 and m/z 206 for β-caryophyllene-d2. Quantification was based on six-point calibration curves as shown in Fig. S12. We have added this description of the quantification method to Text S2 in the Supplemental Information. While the calibration curves for other general monoterpenes and sesquiterpenes are not included here, they can be found in our previous study (Zeng et al., 2022a).

Zeng, J., Zhang, Y., Zhang, H., Song, W., Wu, Z., and Wang, X.: Design and characterization of a semi-open dynamic chamber for measuring biogenic volatile organic compound (BVOC) emissions from plants, Atmos. Meas. Tech., 15, 79-93, https://doi.org/10.5194/amt-15-79-2022, 2022a.

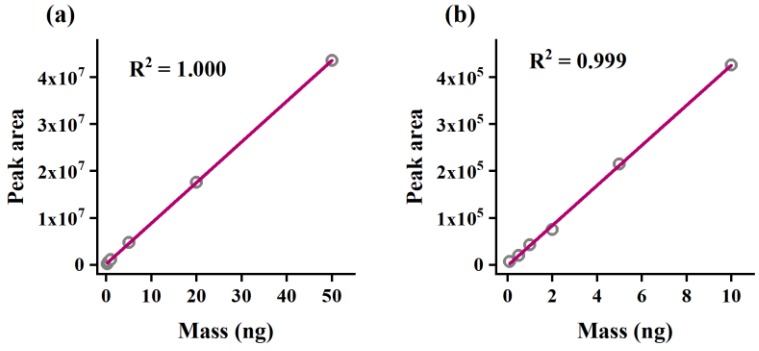

Figure S12. Calibration curves for α-pinene-d3 (m/z 96, a) and β-caryophyllene-d2 (m/z 206, b).

2. It is unclear in which lab experiments the ozone scrubbers were used. Since all experiments appears to have used dry air and if the compressed dry air was free of ozone, it is hard to understand why ozone scrubber is needed. Nonetheless, the author needs to clarify this point to avoid misunderstanding.

Reply: As mentioned by the reviewer, ozone scrubber was only used in the experiments for the ozone effect, while it was not used in any other experiments. We had clarified this in Text S1 "*Ozone scrubbers (Zeng et al., 2022a) were used only during the experiment of ozone effect*"

3. While it sounds reasonable to use deuterium-labeled compounds, which are not emitted by the target research subjects, as internal standard in field measurement campaigns to account for the potential adsorptive and reactive losses of plant-derived volatiles, correction factors derived from these deuterium-labeled compounds still should to be explained with caution. This is because adsorptive losses of these deuterium-labeled compounds cannot only occur on the inner surface of the enclosure, but also on the plant surface (especially leaf surface for broad-leaf species) either by passive deposition or active uptake by plants. When the relative contribution of these two process is not known, the applicability of deuterium-labeled compounds for assessing adsorptive losses may be limited. Anyway, I suggest that the authors should address these considerations in the discussion.

Reply: Thank you very much for the insightful comments regarding the use of deuterated surrogates as internal standards in field measurements. We completely agree that adsorptive and reactive losses of these compounds may occur not only on the inner surfaces of the chamber but also on plant surfaces (e.g., via passive deposition or active uptake by leaves). We have addressed this in the revised manuscript, specifically in the "Conclusions" section: "*It is important to note that, in addition to adsorptive losses on chamber walls, deuterated surrogates may also be adsorbed on plant surfaces (especially leaf surfaces of broad-leaf species) through passive deposition or active uptake. The relative contributions of wall and plant surface losses to the adsorptive loss are not always known, which may limit the applicability of deuterium-labeled compounds for assessing adsorptive losses. However, a larger wall-to-plant surface area ratio and shorter residence times in the chamber (Zeng et al., 2022a) would make the surrogate method more applicable.*" (L319-324)

4. It is unclear how many replicates were used for each experiment, and what the error bars in the figure or the text refer to (standard deviation or standard error?).

Reply: We preformed three replicates for each experimental setting, and the error bars in the figures represent the standard deviation. This has been clarified in the main text (L113-115) "*For each experimental setting, three replicates were performed, and the recovery for a single compound is shown as the mean of these replicates, with error bars representing the standard deviations.*"

Some grammatical errors should be corrected, e.g.,

Line 65, change "existed" to "exists"

Reply: Thanks for your carful check. We have revised it in the revised manuscript. (L65)

Line 72 change "by using surrogates like aromatic compounds with quite different reactivity with O3." to "by using surrogates like aromatic compounds that have quite different reactivity with O3."

Reply: Following your suggestion, we have got this revised in the main text. (L79)