

## Responses to the remarks of the third reviewer

We thank you for your careful reading of the review and will try to make the necessary corrections in the final version of the manuscript. However, in some cases we cannot agree with the claims made, mainly concerning the way the data is presented. The reviewer writes: *«My main issues have to do with structure, synthesis, and the impact of the tables and figures...There are a number of areas where the text can be re-worked for brevity and more streamlined by providing only important details or results of studies without so much extraneous details»* There are no strict criteria and rules for writing review articles, and each of them reflects the characteristic features of the author (authors) of their thinking and style. By the way, the reviewer's remark about "...extraneous details..." reflects his personal way of thinking and perceiving the material. What seems to be "extraneous details" to one reader (for example, an atmospheric chemist) may be of interest and importance to a biogeochemist or microbiologist.

We do not feel it necessary to follow some of the reviewer's remarks, such as the one on line 226: *«It would make sense that a lot or most of these processes are occurring all the time, but perhaps at different rates and interacting/overlapping in various ways depending on the prevailing environmental conditions»*. This is self-evident and needs no further explanation bordering on distrust of the intellectual abilities of Biogeosciences readers. Besides, we do not in all cases understand the meaning of the remarks. For example, what is meant when a reviewer writes: *«...a number of the tables and figures appear to simply re-package data from a single paper and it's unclear why those studies were chosen...»*. What kind of tables and figures, as well as what *single article* are we talking about?

Specific comments and responses to them:

L18: Repetitive with L11, consider deleting.

**We do not think this is a direct repetition and we do not see the need to make changes.**

L40: Delete "to" after the comma

**Will be corrected in the final version of the manuscript**

L40-44: Consider making this one topic sentence by combining and streamlining. E.g. Terrestrial living vegetation is the main source of atmospheric VOCs that significantly affect chemical processes in the boundary layer. These emissions have garnered considerable attention due to the majority of them being highly reactive, and thus, impacting atmospheric chemistry..."

**Okay, we'll think about it!**

L80: It's unclear why methyl chloride is emphasized here, instead, you could use the Bahlmann et al. citation to support the statement that significant biological sources remain elusive.

This is what was meant: important biological sources, for example, such an important component as methyl chloride, remain elusive. Of course, methyl chloride is not the only compound whose sources are not well or not well understood.

L84: What does the acronym TOHRE stand for?

**An explanation will be made**

L87: identify and quantitatively characterize is repetitive, could simply say “identify and quantify.” Also, it’s unclear how we can characterize unknown reactive VOCs...this is a point that could be elaborated upon, and other well-known processes and effects (like the production and destruction of ozone, etc.) could be more streamlined and concise.

**The remark is accepted; corrections will be made**

L108: This sentence is unclear; the concentration of many secondary metabolites is significantly reduced compared to what? Fresh and living leaves?

Of course, in comparison with living intact leaves and in the order in which the foliage is mentioned in lines 107 and 108.

L134: While interesting, the text in this paragraph can be significantly reduced and streamlined. Also, it is unclear how the natural source of reactive VOCs has remained unaccounted for and unquantified if the Zimmerman et al. (1978) paper reported the magnitude of VOCs from leaf litter. Is it that this has remained relatively unexplored since? Please clarify.

The reviewer writes here: «*While interesting, the text in this paragraph can be significantly reduced and streamlined*» and then writes: «*Please clarify*». So what should we do: «*significantly reduce*», or «*clarify*»?

We can clarify this way: Yes, since 1978 there have been no estimates of the magnitude of VOC emissions from the litter of deciduous trees in the Northern and Southern Hemispheres, the American and Eurasian continents. Although over the past 30-40 years, the rates and dynamics of VOC emission by living foliage of most economically important woody plants from the mentioned regions have been estimated.

L154: Specify “these important components” as leaf litter and soil cover and consider moving the definitions of these terms (L172-186) up after L154 and end the paragraph with L154-158.

In our opinion, there is no need for this clarification, since we are talking about these elements of terrestrial ecosystems. We do not understand why these changes and text movements are needed?

L187-189. This sentence is quite long and the clause “available information regarding the emission rates of separate VOCs” seems out of place and not well integrated. Consider revising for brevity/clarity.

**The remark is accepted; corrections will be made**

L217: Change “they” to “that”

This line does not contain the word “they”, which should be replaced with “that”

L233: Please provide a citation for this statement.

Literary reference will be added

L226: The relative proportion or importance. It would make sense that a lot or most of these processes are occurring all the time, but perhaps at different rates and interacting/overlapping in various ways depending on prevailing environmental conditions. This makes it sound like processes like leaching appear and disappear, where in fact there is always that potential, but it becomes more and less important during certain times of the year and under specific conditions. Also, this topic sentence is inconsistent with the content. The biotic processes are mentioned, but this paragraph only focuses on abiotic factors. L236 is vague and not effective in supporting the rest of the text in this section.

It is impossible to understand what the reviewer wants from us in this case? To explain to the readers of the Biogeosciences the completely obvious things he is talking about in this remark? His statement: «*The biotic processes are mentioned, but this paragraph only focuses on abiotic factors. L236 is vague and not effective in supporting the rest of the text in this section*» is also surprising in its inconsistency with the content of this paragraph

L239: More pronounced distinction of what? Please specify and construct a more robust topic sentence.

The remark is accepted; corrections will be made

L254: What does “with the influence of experimental conditions determined” really mean? Please clarify. Did they test in the absence of O<sub>2</sub> and then in humid air? **Exactly as written: in the absence of O<sub>2</sub> and then in moist air (containing, presumably, oxygen)**

Also, L257-261 seem irrelevant considering the initial speculation was made on very limited data. **This is exactly what is written on the following lines of the same paragraph.**

L283-286: Please provide a citation for this and it also seems like a bit of a no sequitur between paragraphs.

**What is said in this paragraph is nothing more than an assumption. There is no way to support it with some literary references. In addition, we do not understand why each paragraph must necessarily be connected to the previous and following.**

L331: Please write out LSC in words to remind reader of the acronym.

The remark is accepted; corrections will be made

L408: This entire paragraph is about one study, and instead, could be briefly summarized to follow up on what was stated on L405, emphasizing that VOCs after sufficient decomposition by microbes were likely the products of their metabolism and point out these specific classes et.g., C<sub>3</sub>-C<sub>8</sub> carbonyl compounds, lower alcohols, etc. L445: the microbial succession section can be simplified and some information from the preceding paragraph incorporated within (instead of it standing alone with lots of extraneous

information). Also, L459 is vague and uninformative as no other details are provided. The following sentence is equally confusing in terms of whether these patterns are generalizable or are site/ecotype specific.

About "extraneous information" we wrote above. What seems redundant to the reviewer is not necessarily so to all readers.

L470: I think this sentence is missing something at the end (a verb?).

Yes, for some reason part of the sentence disappeared in the pdf file and it looks devoid of a verb. Will be corrected.

L630: There are studies on soil cover and below canopy VOCs from deciduous US forests that might be relevant here (See Stoy et al. and Trowbridge et al. 2021).

The work of these authors is cited in our review (line 351, 1193)

I'm not quite sure I see the relevance of Table 1.

Unlike the reviewer, we see it

The inclusion of Tables 7 and 8 are also confusing: Why list all the compound emission presented from one paper? Might this be a copyright issue?

In principle, these two tables can be excluded, but we would not like to do this for the reason that these are almost the only reports on the rates of VOC emission by living ground cover plants. Why not provide this data? The review by Kesselmeier and Staudt published in Biogeosciences (lines 555 & 999) gives emission rates from living foliage of many plant species and this is its value.

The same can be said for Figures 1 and 2 (reproduced data from the author's 2010 paper). Why are these being specifically highlighted when the review should be synthesizing and compiling data from many sources.

The problem lies precisely in the absence of "many sources". We have to make do with those that are published. We hope that the reviewer will not consider self-quoting incorrect in the light of the above?