

Interactive comment on “Long term BVOC fluxes above mountain grassland” by I. Bamberger et al.

Anonymous Referee #2

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General Comments

The manuscript by Bamberger et al. presents BVOC flux measurements from temperate mountain grasslands in Austria. The BVOC measurements were conducted during one growing season in 2008 and fluxes were calculated using two independent methods, virtual disjunct eddy covariance and gap filling. The two methods were in good agreement and the paper presents important results regarding BVOC emissions from the cutting and drying of grasslands. Overall, the paper should be published in Biogeosciences after editorial revisions, both to improve readability and to more accurately convey certain material, and addressing some relatively minor issues listed below.

Specific Comments

While I appreciate the effort involved in the flux measurements, the use of “Long-term” in the title implies a multi-year data set, which is not the case. The title should be

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changed to more accurately and appropriately represent the data set presented in the manuscript. A title such as “BVOC fluxes above mountain grasslands in 2008” or some variation thereof would be much more suitable.

P84, L5: “due to” should be replaced with “from”

P84, L6-7: the following should be revised: “. . .over temperate mountain grassland in Stubai Valley. . .” to either “. . .over a temperate mountain grassland. . .” or “. . .over temperate mountain grasslands. . .”

P84, L15-16: the following needs to be revised: “During the growth only methanol emissions were observed.” During the growth of what? I think you are trying to say that during periods when the grasslands were growing, only methanol was observed. . . please revise the sentence so this is what it says.

P84, L20: “attain” is an inappropriate word choice and “attain to” is gramatically incorrect. Please revise with something more appropriate such as “are emitted” or “reach”.

P84, L22: replace “these” with “the” as follows: “Up to 90% of the emissions. . .”

P85, L5: revise the following: “. . .is poorly determined as quantitative measurements are hard to obtain.” to “. . .is poorly constrained as quantitative measurements are difficult to obtain.”

P85, L8: “due to” should be replaced with “resulting from”

P85, L14: I don’t think “status” is the appropriate word choice for what you are describing – please revise.

P86, L5: “for” should be replaced with “of”

P87, L2: the comma a semicolon as follows: “anemometer (R31A, Gill Instruments, Lymington, UK); . . .”

P87, L3: “sucked” is not an appropriate word choice; please revise with something like

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“drawn”

P87, L5: The units in Figure 2 and the text are not consistent – convert all units to SI.

P87, L19: “home-build” should be “home-built” or something like the following: “. . .through a catalytic converter built in-house. . .” Also, it would be useful to include the operating temperature of the catalytic converter.

P87, L27-28: should read as follows: “. . .rate of 2.82 s until 10 July, when. . .” there should not be a “the” after “until”.

Also, for comparison to other PTR-MS measurements, it would be useful to include the sensitivity in ncps.

P88, L26: remove “exemplarily” – inappropriate word choice and not needed.

P88 and on: I would consider replacing “half-hourly” with “30 minutes” – in most places it makes the text flow better and improves the overall readability.

P91, L7: replace “are” with “were” to read “. . .fluxes which were acquired at 20 Hz.”

P91, L21: replace “less” with “fewer”

P92, L2-3: revise the following: “Methanol was the only measured VOC that was emitted from the undisturbed growing grassland.” to something such as:

“Methanol was the only VOC measured by PTR-MS that was emitted from the undisturbed growing grassland.”

I think it is critical to make it clear that methanol was the only VOC you could measure the emission of using a PTR-MS. If you had other instruments deployed that could measure things like halocarbons, sulfur gases or other NMHCs, you might find that there were, in fact, other gases emitted from the undisturbed growing grasslands.

P92, L5-7: revise the following: “The methanol fluxes we observed during the growing period were in the same range like the methanol fluxes detected by Brunner et al.

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(2007) over intensively managed grassland in central Switzerland.” to read:

“The methanol fluxes observed during the growing period were similar to those reported in Brunner et al. (2007) over intensively managed grassland in central Switzerland.”

P92, paragraph beginning on L8: In general, I feel that the point the authors are making about methanol being the “only VOC with a measurable flux” should be toned down quite a bit. As stated previously, this was the only compound that the author’s measured using a PTR-MS – it is most certainly very unlikely that this is the only VOC with a measurable flux at all. Ultimately, I believe this is an important paper and the author’s results provide key insight to VOC emissions over managed grasslands. Therefore, dismissing the fact that other VOCs are not emitted during undisturbed growing undermines the overall importance of assessing growing, cutting and drying emissions. This is particularly important because of the scale of agricultural processes worldwide and the fact that currently, we do not have a handle on if these emissions are truly important or not because of the overall limited number of studies.

Main point – please articulate clearly that methanol was the only VOC with a measurable flux that you observed with your PTR-MS measurements; do not dismiss the fact that a more comprehensive suite of measurements could show that other VOCs have a measurable flux during undisturbed growth periods!

P93, L9-24: Please revise this paragraph, confusing as written.

P94, L10: It is stated that “No significant monoterpene fluxes from grasslands were detected.” Define “significant” for the reader and it would be useful to put this value into context.

P94, L16: “norway spruce” should be “Norway Spruce”

P94, L16-17: revise “Coniferous forest is known to emit monoterpenes.” to something like “Coniferous forests emit large quantities of monoterpenes.” or “Coniferous forests

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are large emitters of monoterpenes.”

P100, Table 1: It would be useful to identify the other “possible compounds” for the masses listed.

P101, Table 2: Please revise the caption text, in addition to more clearly explaining the point and usefulness of information in the text. If it’s just to show the number of 30 minute cycles, I’m not sure this really needs to be a table, it would be more straightforward to just state the values in the text.

P103, Figure 2: As stated previously, please use SI units consistently throughout the text.

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