

Interactive comment on “BVOCs emission in a semi-arid grassland under climate warming and nitrogen deposition” by H. J. Wang et al.

Anonymous Referee #1

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Title: BVOCs emission in a semi-arid grassland under climate warming and nitrogen deposition
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Comments and suggestions:

This paper discusses BVOCs emission and its response to warming and nitrogen deposition in a semiarid grassland (Inner Mongolia, China). Generally, it can be accepted in ACP, and hope it can help us to better understand the BVOCs emission in this unique ecosystem. Some specific comments and suggestions are as follows:

In P5 L1: what is ANOVA? It should be introduced. In P5 L5: “BVOCs emission was

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measured by static chamber technique for 11 timesand for 13 times”. Please explain the meaning of 11 times and 13 times, and introduce how many samplings were collected for different situations in 2007 and 2008 measurements. In P5 L10: “the transmission of photosynthetic active radiation (PAR) through the chamber was more than 95%”, how does it obtain? It's measured in the chamber in 2007 and 2008 experiments or estimated by a fixed transmission rate? In P5 L18-19: “We found that BVOCs concentration linearly increased with time”. It should be given the time period for the linear response with the time. In P5 L25: please introduce the parameters such as precision and accuracy of GC. In P6 L30-P7 L2: “cut fresh individual green plant, put it into glass syringe with 100 ml VOCs-free air, and incubated it for 3 min under sunshine, then measured the concentration of monoterpane in it to calculate SEF” The SEF measured and calculated in this situation is not the SEF in natural condition, it should be explained clearly in the text. Then, the SEF values obtained in different situations should be given clearly in the manuscript, so as to tell the difference for different emissions. In P9 L9-L12: “Warming did not change *A. frigida* biomass over the two growing seasons. warming marginally increased the biomass of *A. frigida* by 56% ($p=0.087$) in 2007”, here is a conflict for biomass change? In P9 L20-L24 (and other parts in this manuscript): “The mean NER was $266 \pm 53 \mu\text{g m}^{-2} \text{h}^{-1}$ in 2008, which was significantly higher than that in 2007 ($107 \pm 16 \mu\text{g m}^{-2} \text{h}^{-1}$). However, the mean SEF ($0.96 \pm 0.12 \mu\text{g g}^{-1} \text{dw h}^{-1}$) in 2008 was substantially lower than that in 2007 ($1.87 \pm 0.33 \mu\text{g g}^{-1} \text{dw h}^{-1}$).” What's the reason for this conflict between NER and SEF for 2007 and 2008? It may come from the SEF calculated from syringe sampling, how many syringe samplings were collected? and how many syringe SEF values were used to get total SEF? In P13 L10-L15: “In addition, the temperature in 2007 was higher than in 2008, and the SEF in 2007 was also higher, while the natural emission rate in 2007 was lower for drought-depressed *A. frigida*. The different emission rates between 2007 and 2008 further highlighted that the frequently used algorithms of emission response to temperature could not be simply applied in semiarid and arid area, where NPP was more sensitive to drought”. The authors should consider and explain the influence of

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SEF from syringe measurements.

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