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Interactive comment on “A dynamic plant chamber system with downstream reaction chamber to study the effects of pollution on biogenic emissions” by J. Timkovsky et al.

Anonymous Referee #4

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The manuscript by Timkovsky et al. describes a chamber system, which consists of two plant chambers and a reaction chamber. This recently built system was built to investigate BVOC emissions from plants and also the effect of atmospheric pollutants on the BVOC emissions. The chamber system is described in detail and the manuscript is altogether well written. The idea of this chamber system and its automation are great. However, the plant chamber part of the system is defective. Also the manuscript does not offer any new results on the topic of its title. Thus without improving the plant chamber part, I cannot recommend it to be published in AMT yet.

As pointed already pointed out by the other referees, the plant chamber part of the set-

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up needs to be improved before this system can be used for studying BVOC emissions reliably in “natural” conditions. I am concerned about the usage of desiccators as plant chambers.

Material wise glass (I the desiccators are made of glass even though this is not mentioned in the text) is a good choice for the chamber, however, enclosing the whole plant including the roots and some soil is inside the desiccator is problematic. The plant emissions cannot be normalized using only dry needle mass (or area) because roots and soil are possible sources for VOC emissions as well. Perhaps you could consider using a chamber which allows enclosing only the above ground part into it.

The plant chambers should be equipped with fans and the temperature should be controlled to mix the air properly and to avoid too high temperatures. Also the used light levels are way too low compare to natural conditions. These problems are already discussed in detail by Ü Niinemets so I won't go to the details.

Some more detailed comments: Page 9014 lines 13-15: Are you sure that 30 min is long enough time for the emissions to stabilize?

Chapter 3.2 about the emission rates of birch seedlings: Emission rates of birch have been measured and reported (e.g. Hakola et al. Atmospheric Environment, 32, 1825–1833, 1998 and Hakola et al., Boreal Environment Research, 6, 237-249, 2001). In my opinion it would be good idea to compare your emissions to previously published ones to get an idea about their reasonability.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 9005, 2013.

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