

Interactive comment on “No detectable aerobic methane efflux from plant material, nor from adsorption/desorption processes” by et al.

Anonymous Referee #1

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General comments

Since aerobic methane (CH₄) emission by plants was found (Keppler et al. 2006), debates on this finding have been appearing largely. The debates focus on two points. 1) In general, it is thought that the reduced gas CH₄ can be produced via microorganism metabolisms in anaerobic conditions. How do plants produce CH₄ in aerobic conditions? 2) Does aerobic CH₄ emission by plants produce far-reaching environmental implications? How much does it contribute to the global CH₄ budget? In the study presented here, authors investigated whether the measured CH₄ emission might simply arise from plant materials through desorption mechanism. The results show that the desorption fluxes were very small and would play no quantitatively role in contributing to the measured CH₄ fluxes. The CH₄ emission rates of fresh detached leaves of sev-

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eral species and intact *Zea mays* seedlings were zero or, at most, very small in aerobic and low-light conditions. This work adds to the understanding of possible aerobic CH₄ emission.

Specific comments

1. Could molecule adsorption/desorption in filter papers be used to explain those in living plant tissues and dead plant litters? Authors used standard cellulose filter papers (i.e. organic material with a high surface area) to examine CH₄ adsorption/desorption in plant tissues/materials. This probably needs some assumptions. For example, 1) In plant tissues, molecule adsorption/desorption were not related to numerous metabolism processes; 2) Maximal CH₄ concentration in plant tissues/materials were close to the atmospheric concentration; 3) CH₄ concentration were even distributed in plant tissues/materials. Actually, these are not true.

2. On each measurement occasion, individual data points scattered around mean values by 20-40 ppb (Page 2781, Line 16-17). Could you explain it? 40 ppb scatter is approximately equal to an increasing of mean CH₄ concentration during four days (Fig.2). We worry that measured scatter largely disturbed to acquire an actual mean value.

3. Authors also monitored aerobic CH₄ emission by plants, although they were very small (Page 2783, Line 12-15). Authors discussed a possibility that it is indeed possible for methane to be produced by plants under aerobic conditions, at least by some plant materials and under some conditions (Page 2785, Line 9-15). Therefore, Title is reasonable for this work?

4. Authors presented some explanations on gas leakage (Page 2783, Line 16-22). I once compared gas leakage between using plexiglass chamber and quartz glass chamber, and found significant leakage in plexiglass but no leakage in quartz glass. Plexiglass probably has numerous nano-pores, through which gases easily run due to pressure differences between inside and outside. For a fine experiment, it seems that

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plexiglass is not the best materials.

5. In addition, some references were incompletely understood and wrongly described. In Wang et al. (2008), for example, a key result is that some xerophyte shrubs directly emitted CH₄ in aerobic conditions (see Table 1 in Wang et al., 2008). The statements, It is particularly interesting that only one of the studied species produced methane while the others did not (Page 2775, Line 17-18) and The apparent storage of soil-derived methane in woody stems (Page 2784, Line 20-21), are not true.

6. This work, together with previous published studies, indicates that aerobic CH₄ emission by plants is highly uncertain. Aerobic CH₄ emission by plants may be species-dependent. More measurements are needed to form a consistent conclusion.

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