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Comment

Interactive comment on “**Technical Note: Semi-rigid chambers for methane gas flux measurements on tree-stems**” *by* **A. Siegenthaler et al.**

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1. General comments

During the last decade, substantial emissions of methane (CH₄) from stem surface of mature trees have been reported in various tree species which are capable of surviving the anoxic soil condition in temperate and tropical wetland forests. Researchers have been trying to clarify the underlying mechanisms and potential rate-controlling factors of tree-mediated CH₄ transport/emission, and to evaluate the relative contribution of stem CH₄ emission in the total CH₄ flux of the ecosystems or global CH₄ budget. It requires intensive gas flux measurements at stem surface of canopy trees, in terms of

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space and time, to clarify the whole nature of tree-mediated CH₄ emission, because CH₄ emission rates from tree stems have been reported to vary significantly among tree individuals, size and species, and seasonally as well. This technical note deals with the development of a newly-designed semi-rigid gas flux chamber which has various advantages over conventional rigid chambers in the field measurement of gas exchange at tree stem surface. Volume accuracy and permeability of the newly-designed chambers were compared to the conventional rigid chamber in the laboratory, and the examples of CH₄ flux measurements using the semi-rigid chamber in the fields are also shown in this paper. The aims of the paper are quite clear and relevant, and there seems to be no problem in logical composition and data reliability. I would recommend that this technical note could be acceptable after minor revisions commented below.

2. Specific comments

[P.16026, L.8] There is no description on the definition of “Sstem” appearing in the equation 6. Its definition should be added in the text just above the equation.

[P.16026, L.8] In the equation 6, I suppose that a term “ π ” may be not necessary.

[P.16027, L.9] Information on the trees used in the field test of the chambers, i.e., the number of trees for each tree species, and DBH and height of the trees, should be added here.

[P.16030, L.7-13] The authors attribute the variability in observed volume of the sleeve or chamber to the compaction of the Neoprene form. If so, the observed volumes (V_{tot}) are supposed to be always smaller than the theoretical ones (V_{tot}). However, the observed values are sometimes larger than the theoretical ones for the large sleeve and for the rigid chamber (Supplement S1). There might be some other causes for the variability in actual volume of the sleeves (chambers).

[P.16030, L.21-22] There is no description, in any part of the manuscript including the Table 1, on how “the overall inaccuracy for the permeability” was calculated.

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[P.16031, L.1] “The relative standard error (RSE)” should be followed by “of the initial concentration (Co)” for more explicit explanation.

[P.16034, L.9-11] The authors should cite some related articles regarding the minimization of potential errors in gas exchange measurement by a chamber.

[P.16036, L.2-3] Surface of tree bark is often rough and has many cracks, especially when some wetland tree species, such as *Alnus* or *Fraxinus* spp. are selected for the measurement of stem methane flux. So, the expression of “In very rare case” seems to be not appropriate.

[Supplement S1] At the end of the table caption, there is the expression of “difference between V_{tot} (predicted) and V'_{tot} divided by V_{tot} (observed)”. Is this correct? I suppose that it may be “difference between V_{tot} (predicted) and V'_{tot} (observed) divided by V_{tot} ”.

[Supplement S4] In this series of tables, two data sets, i.e. Run 4 (#518-#623) and Run 6 (#734-840), are annotated by a word of “Bad” in the column of tree species, which seems to mean those two runs were the flux measurements with gas leakage between inside and outside of a sleeve. In the text (P.16032, L.16-18) and Figure 6, however, the measurements with leakage were the Run 3 and 6. Please recheck the data regarding this discrepancy.

3. Suggestions for technical corrections

[P.16027, L.6] The “Table 1” is referred at the end of this sentence. As the “Table 1” shows the results of laboratory measurements on volume accuracy and permeability of the three types of chambers, it seems a bit strange that the table is referred in the sentence mentioning the field deployment of the chamber. If the authors intend to show the dimensions of the chamber used in the field test, those information should be described in the text.

[P.16027, L.8] There is a typing error; “*Betula Pendula*” should be “*Betula pendula*”.

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