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Biogeosciences Discussions

Interactive comment on "Contribution of recent plant photosynthates of *Eriophorum vaginatum* and *Scheuchzeria palustris* to methanogenesis and CH_4 transport at a boreal mire: a ^{14}C pulse-labeling study" *by* M. Dorodnikov et al.

Anonymous Referee #2

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General comments: The effects of vascular plants on CH4 emissions from peatlands have been well documented. The mechanisms behind this effect are however relatively poorly known, especially regarding species-specific effects. Dorodnikov et al. address these issues by 14C pulse labeling of mesocosms. The methods used are appropriate. The English is good and the manuscript is generally well-written. However, when several variables, e.g. vascular plant density and water-table depth, vary it is hard to distinguish the specific effects of different vascular plants and such conclusions should be drawn with some care.

Specific comments:

1.page 4364, line 11-13 awkward sentence

2.A high temperature (22/27oC) was used in the experiment, ca 10oC higher than the temperature reported by Saarnio 1997 for the warmest month. The very high temperature is most likely responsible for the 2-9 folds higher CH4 fluxes (se page 4374). Were there any noticeable damages on the vegetation as a result of these high temperatures and more specifically any different temperature effects on Eriophorum versus Scheucheria? Irrespectively, the higher fluxes could be a result of decaying roots etc. if vegetation was damaged.

3.How was the fluxes calculated, i.e., was any filtering applied? Include discussion of how bubbles were treated. It is likely that more of the emission from mesocosms without plants was in bubbles.

4.Flux units. I would prefer mg/m2 h since I doubt that the authors have accomplished a three decimal accuracy on their CH4 flux measurements.

5.page 4374 end paragraph. The conclusion regarding species specific plant-mediated CH4 transport should be drawn with some care. As stated by the authors CH4 emission is influenced by water-table depth, methanogenic substrate and rhizospheric oxidation. I don't think the authors can safely conclude that Scheucheria has a higher methane transport capacity than Eriophorum and dismiss the importance of rhizospheric oxidation in Eriophorum. The most evident result seems to me the very high allocation of 14C below ground in Scheucheria possibly indicating a higher supply of methanogenic substrate in this species (although this as stated by the authors can not be entirely proven without a chemical analysis of rhizodeposits).

6.Fig 3. Ad legend and remove the strange text format of the right axis in the diagram.

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