

Interactive comment on “Multiyear methane ebullition measurements from water and bare peat surfaces of a patterned boreal bog” by Elisa Männistö et al.

Anonymous Referee #2

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The manuscript deals with an assessment of natural methane emission from a patterned boreal bog in southern Finland. The floating gas traps were used to estimate ebullition flux. The authors investigate observed methane fluxes with environmental parameters and ecosystem level methane flux from the chamber and EC methods. The paper contains some interesting material, very impressive introduction, is reasonably well written and is generally well referenced. In summary, the manuscript might be published after revision.

Specific comments

Line 22 – Median estimation of observed fluxes is more representative than a range of

C1

variations. 58, 60, 69, 70, 73, 74, etc – please, check the absence of comma sign in references. i.e. (Strack et al. 2005) instead (Strack et al., 2005).

109 – Expand the climate description for the Siikaneva site, including, snow depth, freeze and ice depth, length of the frost-free period (growing degree days).

115 – Clarify the difference between the observation sites, depth of the studied pool in the central part and at the edge. See specific comment 2 from Reviewer 1. Your response should be added to the manuscript.

145 – Briefly describe how methane concentration from fresh ebullition was interpolated for weekly intervals.

153 - Is it possible to find ebullition flux from the moss cover surface using chamber observations? Potentially, gas bubbles can accumulate within porous peat and then goes up. It should be accounted for upscaling of methane ebullition flux.

176 – Were any significant differences between median and mean (average) ebullition fluxes? The distribution of observed fluxes is far from normal or Gaussian distribution fit (see A1), so median estimation is more representative than mean values.

335 – Methane ebullition flux is weakly related to peat temperature at the deep layer (see Fig. 3). The peat temperature at 50 cm has a seasonal maximum on 220-240 DOY, while CH₄ flux has maximum earlier. What was the pool depth? Does temperature at pool bottom correlate with ebullition flux? What is the reason for the observed relation between methane flux and peat temperature at the depth of 5 cm? Is it the depth where the methane is generating? Discuss it.

590. Fig. 1-6 – I'd recommend to use traditional denote of the date (1-Aug) instead of a number of the day in the X-axis.

590. Fig 1-5 – Y-axis title is mg CH₄ m⁻² d⁻¹, should be (CH₄ flux, mg m⁻² d⁻¹)