

Interactive comment on “Technical note: A closed chamber method to measure greenhouse gas fluxes from dry sediments” by Lukas Lesmeister and Matthias Koschorreck

Anonymous Referee #3

Received and published: 13 March 2017

The study by Lesmeister & Koschorreck addresses the problem of measuring greenhouse gas (GHG) gas (primarily CO₂) fluxes from dry aquatic sediments with coarse particles. They address this methodological issue by combining in a concise way both laboratory and field tests. My major concerns are: - The lack of consistent testing of all three GHG analyzed here (CO₂, CH₄, N₂O). - The lack of testing of the wetting of clay. - The lack of references to studies in terrestrial soils that have addressed some of these methodological problems in the past. Also, address how the results presented here could be applied to terrestrial soils. This would make the better also more interesting for a wider audience.

See also some specific comments: P1, Title: I suggest adding “aquatic” before “dry

C1

sediments”. P1, L14: I suggest using “terrestrial” instead of “normal”. P1, L21: There are some recent studies on GHG fluxes from dry sediments from other regions too (e.g. Bolpagni, Rossano, et al. "Role of ephemeral vegetation of emerging river bottoms in modulating CO₂ exchanges across a temperate large lowland river stretch." Aquatic Sciences: 1-10; Jin, Hyojin, et al. "Enhanced greenhouse gas emission from exposed sediments along a hydroelectric reservoir during an extreme drought event." Environmental Research Letters 11.12 (2016): 124003; Gilbert, Peter J., et al. "Quantifying rapid spatial and temporal variations of CO₂ fluxes from small, lowland freshwater ponds." Hydrobiologia (2016): 1-11.). P1, L22-30: Make clear that it is possible to measure GHG fluxes from aquatic sediments, but that this measures have so far been limited to fine sediments because of methodological constraints. P1, L23: “widespread”. P2, L8: There is some methods, but only for fine sediments. P2, L10: I think you should add “on” before “how”. P2, L20: It is unclear if you really test CH₄ flux (and N₂O) later. P2, L25: This detection limit is for CO₂ and CH₄? P2, L25: “Three replicate measurements”? P3, L13; I miss more information on the characteristics of the chambers used. P3, L14: The effect of adding water was not tested in the lab, was it? This may have influenced the results and needs at least some discussion. P3, L17: Specify if the temperatures reported here and in other parts of the text are air or sediment temperatures. P4, L5: It seems strange that CH₄ and N₂O are presented so late. The title is about GHG but then the manuscript deals mostly with CO₂. What were the limits of detection for CH₄ and N₂O? P4, L8-L22: For clarity and consistency, the text here could refer more explicitly to the concepts of inertness and tightness. Table 1: Any brand name for the clay? Figure 1: Is “CO₂ mixing ratio” the correct name for the y-axis? Why was the incubation for some materials shorter (<4h)? Figure 2: Put the units of flux in parentheses. Statistical tests comparing the fluxes could be added to this figure. The SRC results should be highlighted more in the text.