

Interactive comment on “A simple and cost-efficient automated floating chamber for continuous measurements of carbon dioxide gas flux on lakes” by Kenneth Thorø Martinsen et al.

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Editor review to MS “A simple and cost-efficient automated floating chamber for continuous measurements of carbon dioxide gas flux on lakes” by Martinsen and colleagues.

Dear Kenneth Thorø Martinsen,

Unfortunately, one of the reviewers could not deliver a report because of very understandable private reasons. In order to not prolong the review process further, I will act as the second reviewer (in addition to my role as editor for this MS). The first reviewer already pointed out the most important issues, which I will not repeat here. In the fol-

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lowing I have listed further concerns with this MS. Most importantly, the MS sometimes lacks precision (eg. the technical drawings are rather sketchy, the authors mention that the chambers are cheap but a cost estimate is only provided in the discussion). Sometimes, data are not well enough described (ie values of min/max/trend). I also miss a comparison to independent methods. The authors mention that the data are within the range of previously published data, but this seems a bit redundant in light of the large variation of CO₂ fluxes from individual ponds/lakes. The authors measured CO₂-aq/atmosphere and wind velocity, which allows calculation of fluxes (eg Wannikhof et al., 2009 and refs therein) and could be used for comparison.

The MS is generally written well and the contents fit to the scope of Biogeosciences.

Abstract P1, l9; add comma after ‘often’

Intro P1, l25; add more diverse refs for lakes as ch₄ and co₂ source P2, l5; add ref to formula P2, l8; add more proper refs for controls on gas exchange velocity P2, l14; in comparison to what are small lakes abundant? Perhaps it’s better to say: ‘small lakes (XX-XX m²) are globally abundant’ Better even if you could add some info as to what the total surface area of these lakes is (ie globally) in comparison to large lakes. That would set this statement in a nice global perspective and adds to the importance of your study. P2, l29; unclear what you mean by ‘pressure problems’

M&M General: improve the quality of the technical drawing of the chamber. Add all components including the CO₂ and T loggers (I also presume that there was an anemometer installed on top of the chamber)? There should also be references in the text to Fig. 1. In your MS, Fig. 2 is mentioned first. Also, be more precise with values you provide. E.g. why was the tubing sometimes 2 and sometimes 3m long? You often mention that the chamber is cheap. How cheap? This value comes in the discussion but is a bit out of the blue there. P3, l13. Unclear how the outlet is designed. You added a 2-3m hose connected to the chamber (I presume you used a long tubing so that leakage becomes negligible). Furthermore, you then already refer to outcomes of tests

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introduced in the next section. This is a bit confusing as leak-tightness is important for the chamber design and should thus be appropriately introduced and discussed. For example, I'm missing an estimate as to how robust the measurements remain if eg small waves travel through the chamber causing a temporary volume change of the chamber's interior. This'll be equilibrated by the open tubing but the volume of the hose is limited. Thus, exchange of the chamber's interior atmosphere with the outside atmosphere may occur. P3, l29. Specify the vol of CO2 that was injected. Also, how was it injected? P4, l4; lat/lon designations are incomplete (add N and E) P4, l8; provide location of the metrological station and distance to your study site. P4, l13; Is something missing in this formula? I only see the temporal change of air pressure and constants but not CO2 P4, l19; elaborate how alkalinity was measured

Results General: I'm missing description of data, the reader should get a rough idea how these look like (min, max, general behaviour) - tests of CO2 leakage should be shown (and not only mentioned)

Discussion General: comparison to data from other methods missing

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