Biogeosciences

Discussions

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Interactive comment on "Biogeochemical diversity and hot moments of GHG emissions from shallow alkaline lakes in the Pantanal of Nhecolândia, Brazil" *by* Laurent Barbiero et al.

Anonymous Referee #3

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The manuscript considers gaseous exchange with the atmosphere of shallow lakes in the Pantanal floodplain. The authors consider main findings: "Although these lakes have a similar chemical composition, the results confirm an opposition between the black-water and green-water alkaline lakes, corresponding to distinct biogeochemical functioning. Black-water lakes are CO_2 and CH_4 sources, with fairly constant emissions throughout the seasons. <...> By contrast, green-water lakes are CO_2 sinks but significant CH_4 sources with fluxes varying significantly throughout the seasons, depending on the development of the cyanobacterial bloom."

1) Some of the findings relating to gas fluxes has been already reported elsewhere, which leads this reviewer a sense of lack of novelty or insufficient search for references

by the authors. Data shown in Figures 2 and 3 present processes that are already described and well known for those lakes.

2) Methodology is very unclear.

a. How did the authors measure fluxes?

i. Static chamber: how did the authors assure that anchoring a chamber at about 10 meters apart would not disturb the nearby sediment? Have the authors carried out any experimental validation? It is unclear how gas sampling in the anchored chamber was carried out avoiding disturbing the sediments.

ii. Usually, dynamic chambers determine fluxes through on-site gas measuring system and requires the use of air pump systems. The "dynamic" approach presented by the authors is peculiar and might not negligibly disturb the water-air boundary layer. Please, verify and clarify the method. Multimedia material are welcome as pictures or video streams.

iii. How did the authors calculated and sum both fluxes by diffusion and ebullition? How many gas samples were obtained for determining a single gas flux estimate? It would be relevant to provide in the annexes the linear fits and their corresponding coefficients of determination (R^2) for all measured gas fluxes.

iv. Why gas flux data are only presented hourly? Table 1 lacks information about the days of sampling; it shows only year and month.

b. All the remaining discussion depend on the quality and validity of the gas flux methodology, which is excessively dubious, and must be well clarified.