

Interactive comment on “Rooting and plant density strongly determine greenhouse gas budget of water hyacinth (*Eichhornia crassipes*) mats” by Ernandes Sobreira Oliveira Junior et al.

Anonymous Referee #2

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I think that the paper by Oliveira Jr et al., titled “Rooting and plant density strongly determine greenhouse gas budget of water hyacinth (*Eichhornia crassipes*) mats”, is an interesting manuscript, with some novel aspects of the contribution of free-floating macrophytes in regulating GHG gases balance; especially considering the role that the rooting may play in CO₂/CH₄ release or consumption by regulating the interaction between pleustophytes (their root system) and sediments. My main reservation with this manuscript is that it seems to be a “local study” with few data, and is lack of global sound to fit the Biogeosciences’ targets.

In my opinion, two major aspects have not been adequately addressed in the manuscript. The first one is the actual sink role of the water hyacinth. I believe that this

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plants, as well as large part of the aquatic phanerogams with very fast life cycles can be efficient sink of C, but only “temporary”. They produce a lot of fresh biomass that just as quickly goes towards a rapid degradation/mineralization. This aspect needs to be discussed in detail in order to correctly evaluate the contribution of this species to the GHG balance. The second aspect is related to the mechanism that probably underlies the observed increase in methane emission with increasing the biomass of the species and the roots/sediment interaction. The authors talk about a “chimney effect” based on the possibility of the plant’s roots to carry the gas into the atmosphere. I do not know what is actually the mechanism, however the contact of the roots with the sediment stimulates a complex series of biogeochemical processes that can be taken into consideration in the present research. For example, it could be very interesting to know whether there are any differences in terms of oxygen availability (as well as for nutrients) in the treatments with mesh, above and below it. The availability of oxygen and methane along the water column (beneath the plant mat) could integrate the presented results, supporting them in a more appropriate way. Based on these considerations, whereas the manuscript is of enough quality to be published in a good journal after some revision, I wonder if Biogeosciences is the right target.

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