Interactive comment on “Carbon leaks from flooded land: do we need to re-plumb the inland water active pipe?” by Gwenaël Abril and Alberto V. Borges

Anonymous Referee #1

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The manuscript by Abril and Borges discusses existing conceptions of inland waters in the global C cycle and presents an updated view with a stronger focus on inland water-wetland interactions. While traditional conceptions see upland terrestrial ecosystems as only allochtonous source of C to inland waters, wetlands are known to be an important source of C to inland waters while having a specific ecology which is distinct from both terrestrial ecosystems and inland waters. This new conception is timely as it finally allows for a more complete perception of C cycling through the terrestrial-aquatic continuum of the continental surface.

Both authors have a great international reputation in the field of inland water and wetland biogeochemistry, and their own work has in the past largely contributed to the growing awareness of the importance of wetland-inland water interactions for the biogeochemistry of inland waters. Their long-standing expertise becomes quite apparent in the presented manuscript. The review of existing literature in the field is very complete and their own ideas and perspectives are clearly described in a comprehensive and logically sound manner. I am sure that this manuscript will be of great interest for the readership of Biogeochemistry, and I recommend publication after minor revisions.

# General comments

L38-39: “primary production and respiration in air” What do you mean by “in air”? Above ground/water table?

L59-60: You need a reference for that.

L73-78: Here you should quickly mention that reservoirs are an important form of man-made inland waters.

L90-91: However, Garrels and Mackenzie 1971 were also among the first to show the general CO2 oversaturation in rivers.

Eq. 1: E and Fother should be net fluxes, as ecosystem can for instance take up atmospheric CH4 and as there can also be lateral imports from upstream.

L146-148: Does this exclude or include weathering related fluxes of DIC? Please, clarify.

L189-191: Here, make clear that the weathering of carbonate rocks also involves a mineral source of DIC. That is trivial, but may not be that obvious to the broad readership.

L244-248: Lauerwald et al. used a 0.5° x 0.5° grid

L291-293: I don’t think that Krinner et al. 2005 is an adequate reference here. That’s the paper describing the standard version of ORCHIDEE which does not include flu-
vial C fluxes. Only very recently, models have been developed which include fluvial C fluxes: e.g. DLEM (Tian et al., 2015) and ORCHILEAK (Lauerwald et al., 2017). JULES-DOCM (Nakhavali et al., 2018) is a land surface model that accounts at least for the leaching of DOC from soils.

L416-425: Here I find it a bit odd to report “-NEE”, and not just NEE with their negative values. But that's maybe a question of taste.

L450-451: I think there is a word missing in that sentence.

Eq. 13: You should define the meaning of $\beta$, like “fraction exported laterally”, or something similar. It's obvious from the equations, but it would be nice to have it written in words.

L550: What do you mean by “community”? An ecological community, i.e. the assembly of organisms in one ecosystem?