

# ***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 allochthonous 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 wet-

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land 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 CO<sub>2</sub> oversaturation in rivers.

Eq. 1: E and Fother should be net fluxes, as ecosystem can for instance take up atmospheric CH<sub>4</sub> 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-

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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?

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