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Evolution of hydrological, sedimentary and biogeochemical cycles  
in the the critical zone.

**Title:** Flooded forest increase methane emissions from inland waters

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Almost half of carbon received by inland waters returns to the atmosphere due to microbial activity which may produce methane in anaerobic conditions. The freshwater methane emissions contributes significantly to global carbon cycle, offsetting 25% of estimated land carbon sink. During floods, flooded forest increase wet areas which are potential sources of methane due to the presence of terrestrial organic matter and anaerobic habitats. Despite of flooded forest represents 77% of wetlands in the Amazon river network, the methane emissions from this ecosystems are still poorly estimated. In this study, we accessed the flooded forest of central Amazon floodplain during high water period in 2014. We have estimated methane fluxes using floating chambers by infra red gas analyzer. The methane emissions from flooded forest to the atmosphere were  $6.1 (\pm 16.1) \text{ mg m}^{-2} \text{ h}^{-1}$  in areas influenced by Amazon river,  $4.37 (\pm 5.9) \text{ mg m}^{-2} \text{ h}^{-1}$  in areas of Solimões,  $1.51 (\pm 3.3)$  in Negro and  $25.7 (\pm 30.3) \text{ mg m}^{-2} \text{ h}^{-1}$  in Tapajós. Our result suggest flooded forest emit more methane than rivers and lakes, according to previous reports. Studies must incorporate flooded forest habitats to better comprehend the carbon cycle.

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