

Interactive comment on “Spatial and temporal variations of dissolved organic carbon and inorganic carbon concentrations and $\delta^{13}\text{C}$ in a peatland-stream continuum: implications of peatland invasion by vascular plants” by S. Gogo et al.

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We would like to thank S. Waldron for the substantial and valuable work done in reviewing our article. All the comments and remarks will definitely help us to amend the next version of the article and our future works on these subjects. As already mentioned by the reviewer #1, the main problem of this article is the lack of data to support the conclusion. As you guessed, these results are preliminary results that we thought worth to

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publish. Nothing was known on this peatland before and these were the first measurement of these kinds in this peatland. That is why both spatial and time variability was assessed. The results encourage us to carry on such measurements that will be done in the frame of a French Peatland Observatory Service (Service d'Observation Tourbière). Such structure will enable us to study in more depth the initial tracks unravelled by this study.

1) “to cite in prep material that fundamentally underpins a submitted paper is unfair on the reviewer as the calculations are not transparent” True, we will wait the submission of the in prep material to submit any new version of this article. The fluxes were calculated as follow: a calibration curve which relates water level in peatland piezometer to water flux at the outlet of the peatland was done. The water flux at the outlet of the peatland was experimentally assessed with the gauging by dilution technique (NaCl was used) at different time of the year to have a, as wide as possible, range of water level. Since water level in the peatland was monitored using sensors and loggers, it was possible to calculate a continuous water flux. Then $[\text{DOC}] \times \text{water flux}$ gives the C flux.

2) The discussion on CO_2 critical zone is indeed premature. This aspect will definitely be studied further. The peatland will soon be equipped with temperature, humidity and energy flux sensors, and the C flux will be monitored more frequently as well.

3) The La Gulette peatland is in the Sologne region. The geology of this region is dominated by clay and sand originating from old deposition from the Loire river. There is no carbonate source in the region.

4) “There is no contextualization of the degree of variation around a sampling points” Only conductivity has been monitored for few months at the outlet. These data were not exploited yet.

5) “How do we know it is just microbial respiration and not release of CO_2 production from acetoclastic methanogenesis?” CH_4 production is much lower than CO_2 production and contribution of acetoclastic methanogene is supposed to be low. However,

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to take such CO₂ flux, an alternative would be to use “microbial activity” instead of “microbial respiration”.

6) “How much of the increase in DIC is controlled by changes in water table height than production (lower water table, same pool size = concentration; any mass balance possible to test this?)”. Water table between sampling dates did not vary a lot this year. All the data are not available (piezometers close to the sampling point were installed after May 2008), but, for instance, water table levels in the “Wet Closed” plot were -5.5, -6 and -7.5 cm for August, December and March sampling dates respectively and in the “Dry closed” were -9, -12.5 and -9 cm for August, December and March sampling dates respectively. Such small variations may not explain all the variations observed.

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