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Biogeosciences Discussions

Interactive comment on "Annual carbon balance of a peatland 10 yr following restoration" *by* M. Strack and Y. C. A. Zuback

Anonymous Referee #2

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The manuscript is an elaborated study estimating the annual carbon balance of a peatland 10 years following restoration in comparison with neighbouring unrestored and natural peatlands. Measurements of carbon dioxide (CO2), methane (CH4) and dissolved organic carbon (DOC) were taken into account for the carbon balance which are three of the main carbon fluxes in peatlands. The chamber technique was used for CO2 and CH4. The difference in fluxes is well explained taken into account the hydrological characteristics and vegetation cover and species composition of the three sites. Studies like this are very valuable to better understand the long-term effects of peatland restoration.

The study includes data from only one year. Having done field work myself I know that it is hard to get multi-annual data but I hope the team will be able to continue the

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measurements. I do not agree with the last sentence of the abstract, that because the restored site acted as a smaller source of carbon than the natural peatland this suggests that a near natural carbon balance can be returned ∼10 year post-restoration. The year when the measurements were taken was slightly warmer and drier than the 30-year average. Previous studies showed high inter-annual variability of a peatland carbon balance and therefore I would be cautious to draw general conclusions after one year.

Using the chamber technique with manual measurements is not state of the art anymore but I understand that in some environments it might be the only possible way of taking measurements. Were any tests made with taking more than 4 samples in order to see if fluxes increase exponential rather than linear during chamber deployment?

As I understand the presented CO2 and CH4 flux are the mean of all sample plots which were placed to represent the different vegetation cover and microtopography at each site. From Figure 2 and 5 it seems that net ecosystem exchange (NEE) and CH4 flux are more variable in the restored site compared to the natural site. Are fluxes very different between the different plots in the field for each site or is the spread mainly coming from different days of measurements? It would be interesting to upscale NEE and CH4 taking into account the vegetation distribution of the three sites.

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