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Interactive comment on "Can a bog drained for forestry be a stronger carbon sink than a natural bog forest?" *by* J. Hommeltenberg et al.

Anonymous Referee #2

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The manuscript by Hommeltenberg et al. reports on two consecutive years of carbon dioxide flux measurements made above two bog forest sites. Thereby, the authors compare a natural bog forest with a drained bog forest, which are in near proximity of eachother. Such "paired" sites are rare and strongly needed to further understand carbon dioxide exchange of bog forests. Moreover only few studies of bog forest exists for the temperate region. Therefore the represented manuscript is of great interest for the readers of Biogeosciences. Unfortunately, the authors present carbon dioxide fluxes only, whereas methane fluxes are likely to contribute considerably to the total carbon budget of such big ecosystems. However, the calculations made at the end of the manuscript, considering past and current land use are strongly needed and contain valuable information.

Still I have few major comments and some minor comments, which should be taken care of by the authors prior to possible publication in Biogeosciences.

Major Comments: Eddy covariance measurements of CO2/H2O were carried out with two different infrared gas analyzers. Therefore I am wondering how comparable are these flux measurements and I would like the authors to add further information on the advantages and disadvantages of both instruments but also on the comparability.

Secondly, the authors state the standard corrections for CO2 flux measurements but I was wondering if the fluxes measured with the open-path gas analyzer were further corrected according to Burba et al. 2006. Particularly during colder temperatures, e.g. in winter, this so-called Burba correction accounts for biased flux measurements due to instrument heating. Given the location of the sites I am confident that negative temperatures occur commonly during winter.

Third, did the flux calculations include some sort of storage term – CO2 storage within the vegetation? Even though this term might not be as important on annual timescale it might become important considering the half-hourly flux values. Given the fact that such half-hourly flux data was used to identify functional relations to gap-fill typical occurring data gaps.

Minor comments: P 2193, l 5: "Maximum precipitations occurs during summer" – which share? 50%, 80%? P 2193, l 7: avoid single sentence paragraphs. P 2193, l 12: this is unclear, the peat layer is still pristine but was affected by peat cutting – this is contradictive, please reword. P 2193, l 15: woody area? This sounds like few sparse trees,is this true? P 2193, l 17: average leaf area index – what kind of average, how many measurements? Is this LAI or PAI?

P 2194, l 2: how variable is the C/N ratio. Provide numbers. P 2194, l 21: fraction of "available" nitrogen due to the drainage. P 2194, L12ff: this is very nice and detailed explanation of how much data had to be rejected or how much data has been identified of good quality.

P 2199, l 14 and l 25: Why not using control & treatment site instead of these rather difficult names

P 2200, l 2: please seocify, 50% of what? per day or per month in this case november? what is the average? P 2200, l 4: how many cm on average or sth what give the reader an idea P 2200, l 16: why infinite? P 2200, l 26: Why was Reco normalized for LAI? Please explain

P 2202, l 20: similar to a finnish site, which is located in the boreal region. This would mean the fluxes at your site are rather small or the fluxes at the finnish site are rather larger. Please comment.

P 2203, l 2: both component fluxes or just one?

P 2203, l. 16: replace maximal with highest P 2203, l. 22ff: This is very interesting. If the authors or someone else will take tree cores in the future this should be highlighted, since such second growth period can lead to a second tree ring.

P 2204, l. 12ff: This paragraph is unclear. What are you trying to state? Please reformulate.

Figures are well prepared

Figure 5: Please explain the fraction of Reco

Figure 7: why annual and showing months?

Interactive comment on Biogeosciences Discuss., 11, 2189, 2014.