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Biogeosciences Discussions

Interactive comment on "Litter type affects the activity of aerobic decomposers in a boreal peatland more than site nutrient and water level regimes" *by* P. Straková et al.

Anonymous Referee #1

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General comments:

The study examines the effects that litter quality and water table decrease have on the enzymatic activity and soil decomposition rates at two time scales. This manuscript presents interesting data that can be an important contribution to the scientific community because there are few long-term studies of the effects of water table drawdown on ecosystem processes. The results show that litter quality is the dominant factor affecting enzymatic activity, while water table drawdown plays a secondary role. The authors of the paper were meticulous in the sample processing and data analysis.

I have several suggestions for improvement of the manuscript:

- In the introduction the authors mentioned the effects of water table decrease on some ecosystem processes, but failed to mention why the water table can decrease. Decrease in water table is likely to be an indirect effect of changes in precipitation patterns, increased temperature and evapotranspiration. - Table 1. The authors should be clearer about the number of plots (replicates) that were established at each location. How far apart were the plots from each other? Was there only one plot with two or three bags? - Taking into account the importance of temperature in microbial and enzymatic processes, I think that the authors should indicate why soil temperature was not considered during the experiment. - The authors in great detail explain the procedures and methods; however, I feel that they fail to explore the ecological meaning of their findings. Therefore, I think that the discussion and conclusion sections need further work prior to publication. - The authors should include a brief explanation of why they chose to look at C,N,P and particularly S. There is limited discussion about this in the manuscript. - The authors showed that after a period of 4 and 40 years litter quality plays a more important role than water table drawdown in determining the patterns of microbial and enzymatic activity. I suggest for the authors to also consider and discuss the effects of water table decrease in shorter periods on the microbial and enzymatic activities, such as weeks to seasons. - I found interesting that the pH decreased with time. Changes in pH can have important effects on nutrient availability, especially that of P. The authors should add to the discussion about their reasoning for the change in pH and the implications for the microbial and enzymatic activity. - The authors put a great emphasis on the importance of litter quality over water table decrease on the increase of enzymatic activities, however, the authors should also consider that: 1) the change in species composition and thus litter quality is a result of the change in water table, 2) I would expect that a quick change in water table (hours, days to months) would have a greater effect on the enzymatic activities than the litter fall.

Specific comments - Please add a citation at the end of the first paragraph of the introduction. - In the litter fall section, second paragraph "... 3-5cm thick layer beyond..." should it not be below instead of beyond? - In Fig 3. The authors might consider in-

cluding the mean water table in the graph because it is not obvious to the reader that in the short and long-term the fen had water tables at least twice as low as the bog. - In the results section, the last sentence of the litter type effects, the authors need to clarify if the P acquisition was positively correlated with an increase or decrease in C:P and N:P ratios.

Interactive comment on Biogeosciences Discuss., 8, 1879, 2011.