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Interactive comment on "Nitrogen and dissolved organic carbon (DOC) losses from an artificially drained grassland on organic soils" *by* B. Tiemeyer and P. Kahle

Anonymous Referee #1

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This study is showing very well how DOC/N concentrations are changing in ditch and groundwater of a drained peatland depending on water table changes at different temperatures and offers highly interesting data of DOC/N losses of a small catchment characterized by organic soils over a period of three years. Most favourably the sampling period was characterized by a very dry and a very wet year so that the importance of hydrological conditions on hydrochemical changes could be investigated fairly well. I completely agree with the authors that such data can be hardly found in literature and therefore I strongly believe that the scientific community will highly benefit from a publication of this manuscript. For me it was highly interesting to learn that DOC concentrations in fen groundwater are not necessarily increasing at rising water tables and

also that DOC losses must not play significant role for the total carbon budget. Likewise from the management perspective data of this study are highly interesting. However, I have some doubt that the land use changes occurred within the time of sampling can be discussed seriously here. Apart from this, all parts of the manuscript are written in a clear and consistent manner. Overall, the text is very well structured and organised, making it easy to follow the narrative flow of the text. All figures and tables are informative and substantiate the text. I have identified only few flaws which should be removed by the authors before I would recommend a publication of the manuscript.

The two major concerns I have is that it remains obscure for me 1) which portion of the catchment under investigation is really covered by peatland. Missing this information it complicates the comparison with other studies. and 2) to which extent the considered ditch (= "catchment outlet") in the study is representative for the DOC and nitrogen losses of the total catchment. Can you exclude that ground water export is an important pathway? Regarding the fist point I am not sure if all nitrate and also all DOC found in the fen groundwater is solely originated from the peat soils? From my own experiences (shallow) groundwater received from mineral soils can not only characterised by high nitrate concentrations (» 50 mg N/L) but also by high DOC-concentrations (» 30 mg/L).

There are some more formal things which I would change. 1) I suggest including a "sampling" section after Line 14, Page 3029. Within this new section it should be explained more detailed how sampling of dip wells was performed. In particular if or how samples were filtered and fixed in order to minimize hydro-chemical changes due to aeration of samples (redox-change) and degassing of carbon dioxide (pH-change). 2) At the end of the statistic section (Page 3032, Line 16) I recommend to explain more detailed the "Nash-Sutcliffe coefficient (NSC)". In Wikipedia I found the following which might be useful: "Nash–Sutcliffe efficiencies can range from $-\infty$ to 1. An efficiency of 1 (E = 1) corresponds to a perfect match of modeled discharge to the observed data. An efficiency of 0 (E = 0) indicates that the model predictions are as accurate as the mean of the observed data, whereas an efficiency less than zero (E < 0) occurs when

the observed mean is a better predictor than the model”

And, finally some more minor things. 1) Abstract (Page 3024). I suggest showing also the range of the concentrations of nitrate and DOC. 2) So far I was always translating N-mineralisation with ammonification (formation of ammonium) and nitrification as separate (subsequent) process, however I do not know if there is a strict definition (e.g. Page 3038, Line 27). 3) For me it is new that the EU Water Framework Directive is using 2.5 mg N/L as “target value”?! (are you sure?) 4) Page 3045, Line 13. I would write “a net ecosystem exchange (NEE) of carbon dioxide between around 4000 and 9000 kg C ha-1”.

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