

Anonymous Referee #2

We would like to thank reviewer #2 for the positive review!

The manuscript submitted for publication in Biogeosciences describes an interesting study about the release of DOC and N from drained grassland situating on a peatland. The paper is clearly written and appropriately organized. It contains many interesting and important observations connected to water table and DOC and N cycling. Since the study is so well presented and contains interesting features I'll be happy to see it published. However, there are some questions and comments that I want the authors to address before publishing the manuscript.

The study site is depicted in Figure 1 and showing that there is also “not artificially drained” area. How does it connect to the study site, is it part of the same watershed? If it is, it could have provided excellent reference samples for the drained area to see if the observations made in the dipwells of the drained area apply also in the untouched area. This could have given more insight on the effects of land use actions.

In this context, “not artificially drained” means that this part of the catchment is covered by mineral soils which are not artificially drained by ditches or tile drains (page 5, line 22). Therefore, it could unfortunately not serve as a reference area. The catchment was delineated based on topography. Obviously, Figure 1 was not clear about the extent of the organic soils, as reviewer #1 made a similar comment. Therefore, Figure 1 was updated with an approximate mineral-organic soil boundary, which was derived by augering (Blume, 2005).

In the laboratory methods it is mentioned that “. . .pH measurements are missing. . .”. Does this mean that they were not measured for some reason?

Yes, unfortunately there was a misunderstanding in the laboratory which caused the samples to be discarded before the pH could be measured on these samples.

Regarding the analysis on DON, how accurately does this kind of analysis work in the conditions presented here?

We agree with the reviewer that DON analysis is challenging when high concentrations of dissolved inorganic nitrogen (DIN) are present as errors of the total nitrogen analysis and of the ion chromatography may add up and as total nitrogen analysis is prone to relatively low recovery rates under these conditions (e.g. Graeber et al., 2012; Vandenbruwane et al., 2007).

However, in comparison to most studies on DON where DOC and TN measurements where coupled, we used a stand-alone instrument specifically optimized for TN measurements which has higher recovery rates than coupled devices. Furthermore,

the DOC:DON ratio was independent of the DIN:TN ratio. If there was a systematic underestimation of TN at high DIN:TN ratios the DOC:DON ratio should be higher at high DIN:TN ratios.

We detailed the information on the accuracy of the analyses in the methods sections (page 7, lines 3-4 and 11-14) and included the potential problems of the determination of DON in the discussion (page 19, lines 14-18).

In addition, I would have placed the observations about the lack of correlation between DOC and DON as well as the importance of DON on N losses to the abstract.

We did add the importance of DON to the abstract (page 1, line 21), but not the lack of correlation between DOC and DON as this would, in our opinion, require the results of all statistical analysis to be mentioned as well. However, this would overload the abstract with information.

References

- Blume, S.: Stoffaustrag aus landwirtschaftlichen Flächen im Einzugsbereich der Warnow unter Berücksichtigung des Bodeninventars. Unpublished diploma thesis, Faculty of Agricultural and Environmental Sciences, Rostock University, 2005.
- Graeber, D., Gelbrecht, J., Kronvang, B., Gücker, B., Pusch, M. T., and Zwirnmann, E.: Technical Note: Comparison between a direct and the standard, indirect method for dissolved organic nitrogen determination in freshwater environments with high dissolved inorganic nitrogen concentrations. *Biogeosciences*, 9, 4873–4884, 2012.
- Vandenbruwane, J., De Neve, S., Qualls, R. G., Salomez, J., and Hofman, G.: Optimization of dissolved organic nitrogen (DON) measurements in aqueous samples with high inorganic nitrogen concentrations. *Science of the Total Environment* 386, 103–113, 2007.