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Interactive comment on “Effects of long-term flooding on biogeochemistry and vegetation development in floodplains – a mesocosm experiment to study interacting effects of land use and water quality” by A. M. Banach et al.

Anonymous Referee #1

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General comments

The authors discuss the effects of long-term flooding on soil chemical processes and vegetation development. However, the introduction mostly focuses on the effects of summer floods, whose frequency will probably rise in the (near) future, and its consequences, while a 9 month flooding period is used in the article. Hence, in our opinion the introduction should be adapted to correspond more to the actual subject of this article. Furthermore, the authors should also state in the introduction why their work is unique, especially compared to Banach et al. (2009) and Antheunisse & Verhoeven

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(2008). Although the number of references (80) is too high for a normal research paper, some important papers in this field are not referred to.

Specific comments

Abstract

3265 line 15: Consider removing (including peat formation)

Introduction

As said above, the introduction should be more in concordance with the experimental set-up. Furthermore they should explain why a 9 month period has been chosen in this experiment and discuss its ecological relevance.

3266 line 11: Will peat formation not cause a decrease in retention capacity?

3266 line 13: correct MCLEOD

3266 line 17: consider AND FLOODING TOLERANCE OF VEGETATION

3267 line 3: this line suggests production of CO₂ in submerged conditions. Consider rephrasing.

3268 line 6: other references?

Material and Methods

The description of the experimental design is too concise. Several aspects are missing, such as sampling date of sods, sod size, . . . Was the watercolumn refreshed or stirred during the experiment? This might influence the results considerably.

3268 line 23: consider CULTIVATION HISTORIES

3268 line 25: correct MOWN

3269 line 18: The authors opted for black foil to avoid light influence. Was temperature monitored during the experiment? Please clarify.

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3269 line 19: What are the floodwater mixtures levels based on?

3270 line 5: consider changing reference.

3271 line 21-28: Why has vegetation been harvested in the middle of the experiment?
Please clarify.

Results

References to tables are not correct, please check. (e.g. table 4b does not exist).
Consider adding pH to figure 2.

3272 line 12-13: Remove

3276: State better which Times are compared.

3277 line 15: These N:P ratios seem very low. Furthermore, due to inundation SRP increases while the available N-fractions decrease. However, The N:P ratios increase after inundation. Please consider adding few lines in discussion.

Discussion

The discussion should be expanded more. If one changes a meadow/pasture into a shallow lake, drastic changes in soil chemistry are to be expected. These changes should be discussed more in relation to the relevance of such long-time flooding (e.g. retention capacity, frequency of such events). Furthermore the results should be discussed more in relation to winter flooding and short-term summer flooding, e.g. what might be the possible differences on soil chemistry and vegetation development?

Tables & Figures

General remark: Most legends could be more self-explanatory.

Table 1:

Correct AMORPHOUS.

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Consider Decimal or Right Alignment.

Table 2:

The abundances seem to be pooled per treatment. Why? Please clarify.

In which unit is abundance expressed?

Capital letters are redundant since both grasses and sedges comprise only one family.

Galium spp.: Correct 0;5.

Table 3:

Consider Decimal or Right Alignment.

Table 4:

Consider Decimal Alignment.

Re-consider the order of the effects (single, double interaction, triple interaction).

Explain abbreviations in legend.

Use same number of decimals for all F-values.

Consistency in display of electrical values.

Change TIME (T) in (T).

Table 5:

Consider Decimal Alignment.

Re-consider the order of the effects (single, double interaction, triple interaction) .

Explain abbreviations in legend.

Consistency in display of electrical values.

Change TIME (T) in (T).

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Make both subsections more distinct.

Table 6:

Consider Decimal Alignment.

Re-consider the order of the effects (single, double interaction, triple interaction) .

Make both subsections more distinct.

Remove reference to Table 4a.

Tabulation of $G \times L \times W$.

Table 7:

Which time-periods are compared in this analysis? Please clarify.

Consider Decimal Alignment.

Make both subsections more distinct.

Remove reference to Table 4a.

Tabulation of $G \times L \times W$.

Explain abbreviations in legend.

Figures

Figure 1:

Consider removal.

Figure 2:

Figure is too small.

Increase size (e.g. move legends in figure to figure legend, use X-labels for lower two subfigures, use Y-labels for left column of subfigures, etc).

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Remove (SPW) from Y-labels.

Figure 3:

See comments Figure 2.

Consider changing FIGURE 3 in FIGURE 2 (CONTINUATION)

Figure 4:

See comments Figure 2.

Figure 5:

See comments Figure 2.

Consider changing FIGURE 5 in FIGURE 4 (CONTINUATION)

Figure 6:

Cover percentages for HAY start negatively. Please correct.

Consider changing lay-out of Biomass subfigure (e.g. per treatment two columns, left = HAY, right = PAS)

Antheunisse, A.M. & Verhoeven, J.T.A. (2008). Short-term responses of soil nutrient dynamics and herbaceous riverine plant communities to summer inundation. *Wetlands*, 28, 232-244. Banach, A.M., Banach, K., Visser, E.J.W., Stepniewska, Z., Smits, A.J.M., Roelofs, J.G.M. & Lamers, L.P.M. (2009). Effects of summer flooding on floodplain biogeochemistry in Poland; implications for increased flooding frequency. *Biogeochemistry*, 92, 247-262.

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