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Biogeosciences Discussions

Interactive comment on "Biogeochemical plant site conditions in stream valleys after winter flooding: a phytometer approach" *by* V. Beumer et al.

Anonymous Referee #2

Received and published: 4 March 2009

General comments:

This manuscript describes an interesting experiment, using a phytometer approach to elucidate the effects of winter flooding of soils on plant growth conditions in the following season. The experiment is well designed (replicates, statistical evaluation) and provides valuable results. Interestingly, the authors tested plant regrowth after the flooding had receded and not conditions during flooding. This makes the study new in comparison with existing studies and makes it fit into the scope of biogeochemistry.
The results of the study also support the usefulness of a phytometer approach to study comparable research questions, as pore water measurements and soil extraction

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Interactive Discussion
Discussion Paper

methods may not reflect the actual conditions relevant for plant growth. However, the conclusions drawn from a comparison of plant nutrient contents and pore water measurements are also limited, as they are only descriptive and may not be easily proven. Thus, the authors may consider to weaken some of their statements in respect to this point (see detailed comments).

There are two major problems I see in this paper. Firstly, in my opinion this manuscript does not give enough credit to related and previous work. There are 26 references only, and there are many statements in the introduction and in the discussion that are left without references. In case there are no references, this would make the results indeed questionable and speculative. However, I am convinced that there is a bunch of studies that may support the presented ideas! Thus, I indicated in my detailed comments where I would like to see more references.

Another issue that needs to be addressed is the clarity of the results part. I got lost in this part several times, while trying to follow the statistical comparison of the individual treatments. There is also information doubled, as it is in the text and in the figures/tables. Thus, I would like to have the results section a little bit more condensed on the information that is necessary to draw the respective conclusions. Otherwise the reader may not be able to follow. There are also a few issues concerning the experimental design that I would like to be addressed: Why did you choose this comparably high temperature (15°C) for simulating the winter flooding?

You chose two quite different species for the phytometer approach, what is good and necessary for such an approach. I think you should maybe describe these species a bit more (e.g. L. salicaria has an aerenchym for root oxygen supply in contrast to A. odoratum) and move this part from the methods section into the introduction. You may also better explain here, why you chose to plant seedlings only after the flood had receded instead of having the cores flooded with vegetation on top (as they are both perennial species!).

From what depth did you take your soil cores and was the vegetation removed (how?)?

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5, S3214–S3218, 2009

Interactive Comment

Specific comments:

Introdution
P5204, L 24-P5205 L 4: Give references
P 5205, L 11-17: Give references
P 5205, L25-29: Give references
P5206, L11-29: Give references, this part may also be shortened. Keep some point for the discussion of the results.
P5207, L16-17: There is not explicitly information in the discussion part about this point 5). Thus, I would leave this out, as you do not have both species on one core in a community.
P5207, L26 ff: May be shortened to To test our hypotheses, soil cores from floodplain soils...were exposed to a ...
P5208, L 3-4: Give more information here instead of describing the plants in the methods section.

P5208, L6: From what depth were the cores taken? Also briefly describe in-situ conditions during sampling.
P5208, L9-21: Move to introduction. Additionally you may shorten this part, as you repeat things already outlined in the introduction.
P5208, L22-24: Was the vegetation removed? How?
P5209, L7-8: This repeats P5208 L23. Additionally: Why did you choose sites that have not been flooded for a long time?

Results:
Omit starting paragraphs with Table X shows/presents... Better embed this in the text where appropriate.
P5211 L15: Something is wrong here in this sentence.
P5211, L26: You may say: An opposite effect was found...

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5, S3214–S3218, 2009

Interactive Comment

P5212, L1-2: Not easy to follow. Better say: This was mostly due to the fact that the cores of the ... had much higher biomass than...
P5212, L7: Please omit to start this paragraph with Figure 2 shows... and table 3 presents...
P5214, L7 ff: This paragraph does not go in line with the subheading of this section, as both species are compared here.
P5215, L22f: Please briefly give pH values, as this would be valuable information here, influencing nutrient availability (P) and toxicity effects (NH4, Al).
P5216, L8-10: How did you determine that sulfate reduction took place?

Discussion
P5216, L12ff: Good introduction for the discussion! But omit surprising.
P5217, L7: omit is hard to tell, better: it cannot be concluded
P5217, L22: How could winter flooding ease N limitation? Maybe give references?
P5216, whole paragraph 4.1 (N, P, K effects): Please compare your findings to existing studies and give references.
P5218, L6: the hampered growth... under which conditions? Please repeat here.
P 5219, L5-6: How may winter flooding change Al concentrations? References?
P5219, L16: identity of the phytometers, I do not understand this. Please clarify.
P5219, whole paragraph 4.3: You may also give references here, supporting the impact of agricultural land use on the mentioned parameters.
P5220, L11ff: Please weaken your statement about growth-inhibiting compounds here, as you do not have a conclusive proof.
P5221, L10ff: Here you state that your study did not meet your research question no. 5) (P5207, L16-17)
P 5220-5221: Paragraph phytometer set-up: This is a very good paragraph. Adding more of such general implications to the preceding paragraphs would improve your discussion and make the idea of your approach and the benefits much easier to be identified by the reader. Consider also writing a short, general concluding paragraph.

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5, S3214–S3218, 2009

Interactive Comment

Tables and Figures: Please check carefully your text for overlap with the tables and figures. You may shorten parts of your text and refer to the table or figure instead.

Interactive comment on Biogeosciences Discuss., 5, 5203, 2008.