

Author response to the interactive comment RC2 by an anonymous referee

In the text below, the authors respond to the comments given by an anonymous reviewer. The comments of the referee are given as plain text, while the authors response is given in *italic*.

Comments

The authors investigate the use of a newly coupled accumulation model (Digibog) and a simple hydrological model (Stream) to simulate alluvial peatland development over Holocene timescales in relation to changes in both local and regional environmental conditions. A scenario-based approach was used to assess the sensitivity of alluvial peat growth to environmental changes under a wide range of settings. The results demonstrate that the alluvial peatland dynamics appear to be strongly determined by the setting and dynamics of the local river network, rather than by internal peatland dynamics or regional environmental changes.

This is an excellent paper. It is highly descriptive and well written. Technicalities about the model are well described. As already mentioned by the other reviewer, I believe that the authors should include an overview at the very beginning of the methods that primes the reader for all the various methodological steps and how they fit together. Apart from that and minor corrections (listed below) I believe that the article should be accepted subject to technical corrections.

Thank you for the comments. An additional section will be added between the introduction and the methodology sections, which provides a short overview of the workflow and the used methodology. We hope that the addition of this paragraph improves the readability of the manuscript and provides a short but clear overview of the article.

On line 229 it is written that “This indicates that the increased biomass productivity due to higher temperatures does not compensate the temperature effects”. Do the authors mean “This indicates that the increased biomass productivity due to higher precipitation does not compensate the temperature effects”?

The formulation of this sentence might indeed be somewhat confusing. A higher temperature has a positive effect on the biomass productivity, given the sufficient water supply in temperate floodplains. This has a positive effect on the peat accumulation rate. On the other hand does an increased temperature also lead to higher evapotranspiration rates and biomass decomposition rates, which negatively affect the peat accumulation rates. As the sensitivity analysis shows a decrease in peat thickness with rising temperatures, we conclude that the positive effect on the biomass productivity does not outweigh the negative effects on biomass decomposition and evapotranspiration. The sentence will be modified to convey this message more clearly.

Figure 4 - Could you provide more information about what means scaled parameter? To my point of view, the x-axis should be graduated.

The label on the x-axis ("scaled parameter") can indeed be somewhat confusing. Each parameter is varied over a specific range, which is mentioned in table A6. As such, the absolute values on the x-axis are different for each parameter. To present the figure more clearly, the label will be changed to "minimum value" and maximum value", with a reference to table A6 in the figure caption. This allows the reader to look up the minimum and maximum value of the simulated range for each of the parameters in table A6 and keeps the nomenclature consistent between figure 4 and table A6.