

## ***Interactive comment on “Uncertainties modelling CH<sub>4</sub> emissions from northern wetlands in glacial climates: the role of vegetation” by C. Berrittella and J. Van Huissteden***

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The manuscript by Berrittella and Van Huissteden “Uncertainties modelling CH<sub>4</sub> emissions from northern wetlands in glacial climates: the role of vegetation” is focused on sensitivity of modeled methane emissions to parameterization of vegetation types. This manuscript follows another paper by the same authors published in CP in 2009 “Uncertainties in modelling CH<sub>4</sub> emissions from northern wetlands in glacial climates: effect of hydrological model and CH<sub>4</sub> model”. While the manuscript under revision certainly addresses an important question of CH<sub>4</sub> emission sensitivity to vegetation parameterization, a quality of presentation and discussion is much lower than a quality of the CP

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2009 paper. I am not sure what is a reason for this, perhaps the authors did not have enough time to polish the paper, but this is definitely not an excuse for submitting a paper in a bad shape. For example, analysis of the model results in the paper is almost absent, usage of terminology is often sloppy, figures are in a rudimentary shape. The sections do not include material they should - the abstract is more an introduction to the problem than a summary of the paper highlights.

If the hope was to improve the manuscript during the peer review process, this wasn't a good idea. As an editor I always have a trouble to find reviewers for weakly written papers. It was not possible to find a second reviewer for several months, and I had to review the paper myself. My conclusion, in line with the opinion of the first reviewer, is that the manuscript in the current format does not merit a publication in CP. A rejection of the paper would be a normal decision in this case. However, since the authors are definitely capable to write a good paper such as CP 2009, I request a major revision of the manuscript assuming that the authors will find a time to rewrite the paper up to much higher standards and account for all comments of the 1st reviewer and my specific remarks listed below.

**Abstract.** The abstract should be completely rewritten. The main qualitative summary of the paper is in the first two sentences, while the rest of the text rephrases the introduction section. What are the main paper results? What is a relative importance of vegetation types, root exudation, oxidation rate, Q<sub>10</sub>, water table level, etc. for the methane emissions? What is a difference in model sensitivity between present day and glacial conditions? The model findings regarding sensitivity should be clearly highlighted in the abstract, as well as in the conclusion section, preferably in quantitative and not qualitative terms.

**Results.** The results section is a compilation of figures with very little analysis done. The language is sloppy, e.g. section 5.1 is called “sensitivity OF vegetation” while it should be a “sensitivity TO vegetation” if I understand the paper correctly. Many figures with few data points (e.g., 2, 4, 6) could be effectively replaced by tables. Sensi-

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tivities to different parameters much be compared among each other so that a general conclusion about most sensitive model parameters could be reached.

Discussion. I recommend to combine results and discussion sections since there is little observation data or other studies to compare with the model results. There is not much what can be discussed beyond analysis of the results.

What I miss in this section is a discussion of model limitations. For example, does the model accounts for the permafrost carbon? If not, what is a possible effect of this on methane fluxes and hydrology? What are other known model deficiencies essential for different model applications?

Conclusions. What are the main findings of the paper? What are the most important model parameters? As I said above, a comparative analysis of effect of different factors on CH<sub>4</sub> emissions should be included.

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Interactive comment on Clim. Past Discuss., 6, 2651, 2010.