Interactive comment on “Uncertainties in modeling CH$_4$ emissions from northern wetlands in glacial climates: effect of hydrological model and CH$_4$ model structure” by C. Berrittella and J. van Huissteden

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In their manuscript, Berrittella and van Huissteden address an uncertainty in glacial CH$_4$ emissions from northern wetlands by comparing two modelling approaches on large-regional scale. Since there is no direct data to compare with the model results for the glacial conditions, the authors do their best by testing the model against the present-day data. An interesting outcome of their study is that glacial wetland expansion on the exposed seafloor may have compensated for a decrease of wetland area due to continental ice cover. The paper is well structured and easy to read, but some
formulations are written in too generic form and units are often missing or mismatched. This should be improved in accordance with the comments listed below.

Specific comments

Abstract: “Methane (CH4) fluxes from northern wetlands may have influenced atmospheric CH4 concentrations at climate warming phases during the 800 000 years and at present global warming.” This is a very weak statement. There are no doubts that CH4 fluxes from northern wetlands have influenced atmospheric CH4 concentration in the past and that they are important at present and in the future, disregard of the warming or cooling phases. The authors surely had a more specific point in mind.

Page 825, section 2.2.3: BIOME is a biogeography model, while the BIOME3 model includes carbon cycle. The authors should be more precise about the model names.

Table 1: What are the units? “Corresponding values are reported in Fig. 1.” Reference to the Fig. 1 is wrong. Should it be the Figure 9?

Fig. 2: “The upper map displays simulated fluxes of peatland for each climate model gridcel (ST3ADHOC climate). Should it be “fluxes of methane”? “The lower map shows the model results after overlay with the wetland distribution map.” What exactly is shown on the lower map – CH4 fluxes or wetland fraction?

Page 832, l, 1-2: “Results for the same climate (Fig. 8) differ at least about 1 GTon ..” The units are wrong.

Fig. 10: again, what are the units here?

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