

Interactive comment on “A new model of Holocene peatland net primary production, decomposition, water balance, and peat accumulation” by S. Frohling et al.

Anonymous Referee #1

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Overall Evaluation

This manuscript represents a very nice study that describes the development, evaluation, and analysis of a peatland carbon and water cycling model, the Holocene Peat Model (HPM). The manuscript is written in a very scholarly manner, and I especially appreciated the section on the background of modeling peat accumulation. The HPM builds upon the conceptual progress made in previous efforts and is very integrative with respect to how it has coupled carbon and water dynamics. I was particularly impressed with the ability of the model to represent the response of net primary production to peat depth and water table depth of 12 different plant functional types. To my

C50

knowledge, this is the first model to deal simultaneously with interactions among water table dynamics, peat depth, vegetation productivity, decomposition, peat bulk density, peat hydraulic properties, and peatland hydrology. The issues not explicitly considered by the model (temperature, nutrients) are appropriately discussed near the end of the manuscript. The evaluation against the MB930 core is appropriate and revealing. The sensitivity analysis was also insightful, particularly with respect to issues involving hydrology.

The only substantive comment was that the sensitivity analysis seemed rather tedious to read. I'm wondering if some subheadings could help out. Also, I was wondering whether it might be possible to graphically present the results in Table 5. One suggestion I have is for two bivariate plots: (1) of the relative sensitivities of hpd vs. zwt for changes in parameters from the base case, and (2) the relative sensitivities of NPP (or %NPP in peat) vs. peat mass for changes in parameters from the base case.

Specific Comments

Figure 6a and 6b: The x-axis on these figures is not labeled. I'm assuming that it should be mass of PFT.

Conclusion, Line 4 (page 145): Change “umambiguous” to “unambiguous”.

Interactive comment on Earth Syst. Dynam. Discuss., 1, 115, 2010.

C51