

Interactive comment on “Modelling Holocene peatland dynamics with an individual-based dynamic vegetation model” by Nitin Chaudhary et al.

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The hindcast is an important test to make sure that a model effectively captures past documented climate change and is realistic. Unfortunately, the simulated temperature and precipitation curves in Figure 5 show major discrepancies with reconstructed data from Canada and Scandinavia, challenging the robustness of the presented model.

1) Stordalen

The temperature history of northern Europe is well known and consists of cold and warm phases which alternate on a millennial scale. A good reconstruction for the last 2000 years is from Esper et al. 2014 (their Fig. 5c).

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<http://onlinelibrary.wiley.com/doi/10.1002/jqs.2726/abstract>

The amplitude of the documented millennial-scale temperature changes is 2°C. Figure 5g in Chaudhary et al. does not include any of these millennial-scale changes, indicating that some important forcing parameter is missing or is significantly underestimated in the climate model that has been used.

Also, the longterm warming trend 4500-1700 yrs BP in Fig. 5g does not match with palaeoclimate reconstructions from Scandinavia. Following the mid Holocene climate optimum (8000-5000 years BP), a longterm-cooling trend has been observed. This is the exact opposite of what is shown in Fig. 5g in Chaudhary et al. The cooling trend is documented e.g. in Nesje et al. 2008 (their fig. 3; doi:10.1016/j.gloplacha.2006.08.004), Bjune 2005, Eldevik et al. 2014 <http://www.sciencedirect.com/science/article/pii/S0277379114002650?np=y>

Likewise, the precipitation history in Scandinavia was characterized by similar variability which is not reflected in Fig. 5i. For example, the Medieval Climate Anomaly (MCA) in Scandinavia was anomalously humid. Again, this is not reflected in Fig. 5i where the MCA appears rather dry.

2) Mer Bleu

Again, the temperature curve in Fig. 5h does not show any of the millennial-scale temperature variability. See e.g. Marchitto and deMenocal (2003) for a temperature reconstruction off Newfoundland for the past 4000 years. <http://onlinelibrary.wiley.com/doi/10.1029/2003GC000598/abstract>

Likewise, the longterm warming trend illustrated in Fig. 5h from 8000-3000 years BP does not match palaeoclimate reconstruction data which shows a cooling for Canada and the Arctic. See e.g. Gajewski 2015 <http://www.sciencedirect.com/science/article/pii/S0921818115000417>

The major discrepancies between simulated and reconstructed climate data cast doubt

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on the skill of the model that has been used. How do the authors explain these discrepancies?

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