

Interactive comment on “Biogeophysical impacts of peatland forestation on regional climate changes in Finland” by Y. Gao et al.

Anonymous Referee #1

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I commend the authors for a timely study about effects of human actions on the climate system. The paper describes how the representation of vegetation in the calculation cells of the REMO model have been improved with the aid of the data of the Finnish National Forest Inventory (FNFI). This allows for estimating the effects of peatland drainage (that allows tree growth, that is, forestation) by using results of two inventories, between which a substantial change has occurred. My expertise is forest modeling, I am not able to judge the details of application of the REMO model.

The results are derived from two 18 year long simulations with REMO that use vegetation cover data from two FNFI measurements. The main finding is that peatland forestation results in strong spring warming that is highly heterogeneous spatially and temporally. There are also effects on albedo, precipitation and net surface radiation

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throughout the year.

The results compare favorably to some observations. They are presented and discussed somewhat from the point of view of their sensitivity to input data and parameter values. However, the paper would be even better if a more comprehensive sensitivity analysis had been made by additional model runs. For example:

- The paper discusses uncertainties in background albedo values (l. 527- 558)
- Local effects of peatland forestation areas on maximum net surface solar difference (l. 503-525)
- Uncertainties in translating FNFI cover information to a compatible form with REMO (l. 220-224)

Runs with systematically changed input data/parameter values would give a better understanding of the relative importance of different factors to the results.

The results of simulations are discussed in terms of peatland forestation. However, the two FNFI measurements that are 80 years apart record also many other changes of forest cover apart of peatland drainage. I would like to see a discussion what other factors (e.g. stocking) may have affected the simulations.

The paper is well written. I have marked to the MS (Supplement) some passages that could be improved as well some other small comments.

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/11/C4600/2014/bgd-11-C4600-2014-supplement.pdf>

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