

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

Anonymous Referee #3

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Gao and co-workers mainly analysed the climate effects of peatland afforestation as simulated by REMO. As an experimental set-up they used the land cover in 1920s and compared it against the land cover in the 2000s and compare 5 subregions with contrasting land cover changes. Although the manuscript is already in good shape, its potential impact is likely to further increase by implementing the following general suggestions:

(1) A more careful selection of the figures could reduce the length of the manuscript and better distinguish the details from the main messages. Fig 5 and Fig 6 could be display with fewer months. That would allow plotting larger subplots without losing information. Figure 6 is barely mentioned in the manuscript, the patterns are correctly described by random. The figures add little information. The information contained in

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fig 1 could easily be added to any of the subsequent figures (or better repeated on all subsequent maps). Fig 1 shows the altitude of the sites but nothing is done with that information. The information in Fig 3 could be added to Table 3. In its current presentation, figure 11 does not help to convince that the model does a good job. I suggest a correlation graph between the modelled and observed temperature changes in February, March and April would better present the message. (2) The manuscript deals with the effect of land cover change and one of its strengths, i.e., that it has also an area of peatland restoration, is hardly used. Subregions 1 and 2 are discussed in detail much fewer attention is given to subregion 5 but this could add a very interesting perspective to the discussion. (3) There is no figure showing the relationship between landcover change and climate change. Simple correlations between all land covers in table 1 and the observed temperature and precipitation differences may result in some interesting perspective(s). The same analysis could be repeated for the drivers, i.e., change in albedo, change in ET, ... (4) At several places in the results and discussion, cloud cover and atmospheric inversions are mentioned as drivers of some of the observed changes but no evidence is provided to the reader. Is this a result from the analysis or a (logical) induction by the authors. (5) In fig 8 subplots have different units. In the text these subplots are compared as if they have the same units (p11262, 20-22). Converting the units would result in a more convincing presentation.

Minor comments The term 'unproductive peatland' contains some contradiction as these sites are so fertile that they are drained and used for forestry and agriculture. What is the reference for the word 'unproductive'? Euro's, water, carbon, ...?

The objectives (top page 11253) are rather vague. Reword and add some details.

Mention the effects on keeping land cover unchanged outside of Finland. This basically means that your experiment can quantify the impact of land cover change for Finnish climate but is not suitable to attribute observed changes in climate to land cover change.

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