

## ***Interactive comment on “Combined biogeophysical and biogeochemical effects of large-scale forest cover changes in the MPI earth system model” by S. Bathiany et al.***

**Anonymous Referee #2**

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Review comments to “Combined biogeophysical and biogeochemical effects of large-scale forest cover changes in the MPI earth system model” by S. Bathiany et al. submitted to BG. General comments The authors conducted several experiments to explore the biogeophysical and biogeochemical effects of large-scale forest cover changes in the MPI earth system model. They used an MPI-ESM, which consists of the atmosphere general circulation model ECHAM5, the land surface model JSBACH, the ocean model MPIOM and the ocean biogeochemistry model HAMOCC5. Each part of the MPI-ESM model, ECHAM5, JSBACH, MPIOM or HAMOCC5 is well documented and one of the best models in their corresponding fields. The results from these experiments are very significant. This study and the results should make an excellent

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contribution to the earth science. The article was well written, only the structure of the manuscript is not good for the readers. I recommend the authors reorganize the manuscript. I recommend this manuscript be accepted by BG. Specific comments 1. In section 3 “Results”, it might be easier for the readers if the authors could put section “3.2 Regional biogeophysical mechanisms” and “3.3 Regional changes in carbon pools” together to explain the results. I don’t see any reason why the two subsections should be taken apart. 2. On page 4, lines 115-120, there are some biases between the model vegetation carbon and soil carbon estimates and the observations. In the section discussion, the authors should put some discussions there if the underestimated vegetation and carbon could affect the model results a lot. In figure 2, it would help a lot if the authors could put the same maps of living biomass, soil+litter for the other sensitivity experiments, AT, DT, AB, DB. Then the authors would know where the carbon storage changes the most for each experiment. Or the authors should put figure 10 after figure 2, or figure 5. Combined figure 5 with figure 10, the changes in terrestrial carbon storage can be explained more clearly. 3. Since the energy balance and water cycle are the most important factors causing the significant changes in each experiment, I recommend the authors add another panel of spatial figures for the global net incoming radiation, or a panel of figures like figure 6.

I recommend this manuscript be accepted by BG.

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