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Interactive comment on "Sub-grid scale representation of vegetation in global land surface schemes: implications for estimation of the terrestrial carbon sink" *by* J. R. Melton and V. K. Arora

Anonymous Referee #2

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This work examines how the composite vs. mosaic approaches to address subgrid variability influence simulated fields using CLASS-CTEM. This is a story that needs to be told and the authors do this quite well. A worthy addition to Biogeosciences. I find this very well-written, coherent, and acceptable for publication largely as is, pending a few more minor technical issues outlined below. Note that I only list language/wording issues I found that R1 had not listed.

Pg 16009: "is inïňĆuenced by the leaf phenological, light" You mean phenology here?

Pg 16015: "the regions where composite simulates larger values" Missing word?

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Section 3.1: Could you clarify which runs are used when you compare with reference datasets? Initially I thought you were comparing pre-industrial with Beer et al, which strikes me as the wrong thing to do... Later now, when I got to Table 2 I realized you are indeed comparing pre-industrial with current. I am troubled both by why this was done (why not use a transient run?) and that the mismatch is generally small. Have we spent so much scientific capital on understanding the effects of global environmental change wrt the carbon cycle only to find out that it's moot point, that pre-industrial sims agree with current estimates of C cycling?

I am curious how grid cell size influences your results? This is likely beyond the scope here but it strikes me that the impact of composite vs. mosaic will vary as function of spatial resolution.

I would appreciate a compact treatment why composite vs. mosaic causes such a mismatch wrt LUC emissions. The Russian grid cell vignette, while useful, did not generalize sufficiently. That is, either a table with some simple heuristics or an a figure that shows the mismatch based on H and land cover changes etc. I think this would add value.

Interactive comment on Biogeosciences Discuss., 10, 16003, 2013.