

Interactive comment on “Climate and land use change impacts on global terrestrial ecosystems, fire, and river flows in the HadGEM2-ES Earth System Model using the Representative Concentration Pathways” by R. A. Betts et al.

Anonymous Referee #1

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General: I find this manuscript too Hadley Center centric in the recounting of past work. In the field of Earth System Modeling this may be reasonable when writing a technical report directed to Hadley Center scientists; however, it's important to put this manuscript in international perspective when submitting to a journal directed to the international scientific community.

- 1) p. 6175: For historical perspective please mention coupled simulations by Levis et al. and Matthews et al. from the late 1990s and early 2000s.
- 2) p. 6176: Same as comment (1) and, when you introduce fire, please mention pub-C2047

lished work by Kloster et al. and Li et al.

- 3) p. 6178, line 11: A unique characteristic of this model? Please mention work on the land-atm coupling strength published by Koster et al.
- 4) p. 6178, line 13: I think you need to change "which" to "with"
- 5) p. 6179, lines 1-5: For historical perspective mention that the CSM/CCSM/CESM lineage of models has taken this approach since 1996 or so.
- 6) p. 6180, line 5: You need to follow "Index" with "(FFDI)"
- 7) p. 6180, lines 22-24: Not clear whether you used those.
- 8) p. 6181, line 9 and line 22: Remove "of" and change "projection" to "projections"
- 9) Section 2.3: For historical perspective mention Peter Lawrence's published work on how this was done in the CESM; possibly other CMIP papers from other modeling groups, too.
- 10) p. 6183: Did you mention model resolution in the Methods? If not, then that's where you should mention it.
- 11) p. 6185, line 18: change "area" to "areas"
- 12) p. 6185 line 19 to p. 6186 line 11: ...due to co2 fertilization?
- 13) p. 6188 last line: Remove "in seen"
- 14) Section 3.4: Again, I think there's published work on CCSM or CESM-simulated river flow that's worth mentioning here for the broader perspective.

By the end of this section I felt that these results were too general and too vague (you wrote "not [...] quantified [...] as further simulations are required"), yet, you included what I perceived as unnecessary detail. Does all the detail serve a purpose when meanwhile you cannot definitively explain the second order effect? Since you plan to devote another paper to runoff changes, then I suggest simplifying this section to

convey its basic message and not distracting the reader with unnecessary detail.

15) p. 6190: Change "glopbal" to "global" in line 1 and remove first "been" in line 3 and change "difference" to "different" in line 16.

16) p. 6191, lines 18-19: I don't understand what you mean by "main cause ... was the regional climate change as opposed to the vegetation response." Doesn't the vegetation respond to the climate change? Please clarify.

17) p. 6194, line 14: Didn't Australia, the US Southwest, and Greece also have record fires in recent years?

18) p. 6194, line 18: Please include the reference.

19) p. 6195, line 1: Replace "although" with "and"? Remove "in".

20) p. 6195, lines 9-11: you seem to be hypothesizing, so should you say "potential importance" in line 5?

21) p. 6195, line 12: Please explain why and in line 22 please add references.

22) Fig. 9: Do you mean "northern Europe" in the caption?

Interactive comment on Biogeosciences Discuss., 10, 6171, 2013.