

Interactive comment on “Carbon sequestration in managed temperate coniferous forests under climate change” by C. C. Dymond et al.

Anonymous Referee #2

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This manuscript written by Dymond et al. aims to project future forest carbon dynamics within an area in north-central BC as a function of interactions of species composition, climate change, fire, and forest management. Simulations are conducted using the LANDIS-II forest landscape model. They developed a new LANDIS-II extension (ForCSv2) that aims to tract the Net Sector Productivity, a metric incorporating the Net Ecosystem Productivity and the emissions from wood products and disturbances. Generally, the paper is very well-written and I did not find major flaws in the methods. The use of LANDIS-II is appropriate as it can readily incorporate disturbances and species-specific climate change impacts on growth in a spatially explicit framework. The development of the ForCSv2 extension in this context was therefore much needed and now greatly complements the existing LANDIS-II extension’s library. I have

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very few comments and questions on the paper which are listed below. The authors simulated harvest and fire as disturbances. However, they did not include any insect disturbances, most notably mountain pine beetle (MPB) outbreaks. It's quite puzzling as current LANDIS extensions allow for such an integration. Furthermore, the most recent MPB outbreak had a tremendously high impact on the forest carbon dynamic of central BC. Clearly, the odds for a MPB outbreak as severe as the one that took place in the beginning of this century within the next 35 years (up to 2050) are small given the high mortality rate that was observed. However, several authors (Régnière and Bentz, Safranyik, Logan, . . .) reported that climate should become more suitable for MPB in the upcoming decades in this region. The authors should clearly state why they omit to simulate MPB outbreaks. Giving the uncertainty in future MPB outbreaks, it could be relevant to model the C dynamic with and without a MPB outbreak by 2050. I would like to have a little bit more information about the 144 future climate projections that were used for this study. Which GCM, RCM were used, which anthropogenic forcing? No need to list them all of course. This paper is all about carbon dynamic. As such, authors should drop sections that refer only to changes in species range/biomass unless there is a direct link with the carbon dynamic. In this context, the last paragraph of section 4.1 should be dropped as it stands right now.

1. Does the paper address relevant scientific questions within the scope of BG? Yes
2. Does the paper present novel concepts, ideas, tools, or data? Yes
3. Are substantial conclusions reached? Yes
4. Are the scientific methods and assumptions valid and clearly outlined? Partially
5. Are the results sufficient to support the interpretations and conclusions? Yes
6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Partly
7. Do the authors give proper credit to related work and clearly indicate their own

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new/original contribution? Yes

8. Does the title clearly reflect the contents of the paper? Yes

9. Does the abstract provide a concise and complete summary? Yes

10. Is the overall presentation well-structured and clear? Yes

11. Is the language fluent and precise? Yes

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Yes

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? Yes, see comments above

14. Are the number and quality of references appropriate? Yes

15. Is the amount and quality of supplementary material appropriate? Yes

Interactive comment on Biogeosciences Discuss., 12, 20283, 2015.

BGD

12, C9571–C9573, 2016

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