Biogeosciences Discuss., 11, C8155–C8158, 2015
www.biogeosciences-discuss.net/11/C8155/2015/

Biogeosciences Discussions
Open Access

Interactive comment on "Scaling from individuals to ecosystems in an Earth System Model using a mathematically tractable model of height-structured competition for light" *by* E. S. Weng et al.

M. Smith (Referee)

Matthew.Smith@Microsoft.com

Received and published: 20 January 2015

I congratulate the authors on a thorough piece of work that must have taken a lot of effort. In their study the Authors assess and provide evidence that they have successfully coupled their DGVM to an Earth System Model. On the basis of the evidence it appears as though they have been successful, although that evidence is presented for only one type of vegetation. The introduction lays the foundations well and the program of work undertaken is important to establishing whether the LM3-PPA coupling works – however I was left feeling disappointed as I read the results and discussion that the

results being presented were so limited, in terms of rigor of assessment for deciduous Northeastern US forests and in terms of vegetation globally. While “The model is formulated to be the land surface component of an Earth System Model” I would expect that the present analysis falls far short of establishing the LM3-PPA as being adequate for that purpose. Though the authors are very open in terms of the scope of the present analysis. Overall I recommend that the paper is published with minor revisions because it requires a different study to establish global performance

Larger recommendations: a) On the subject of using the PPA globally – my understanding is that PPA works fine when you have closed canopy forests, but that precisely what to do when that is not the case, and how it works when LAI<1, is not well established. It would be disingenuous to imply that extending the PPA to work globally would be straightforward when its not clear how it should be applied in nonclosed canopy forests. That said, if it genuinely would be straight forward then I have no problem with this point not being mentioned. b) Methods – it is unknown to me why you restrict your analysis to a maximum of 3 tree species. I understand your experiments to establish competitive dominance and evolutionary optima etc.. but is a maximum of 3 species how you’d propose to model stand dynamics for northeastern deciduous forests? If not then you’re not even showing how you’d model these forests in an ESM. c) Results: It is unclear to me what, of what you have found out, is novel compared to the previous work. I have seen PPA outputs for different forests throughout the US and the core formulation has been established for some time. So what new does this paper bring to the table? What specific things did you learn about how to model stand dynamics when moving form a presumably uncoupled PPA to an ESM coupled PPA? If it is to just report that you have successfully coupled it to an earth system model then that is not a scientific paper – it’s a technical report (and maybe should be published in a different journal). Now, of course, you do show this coupled model working, to the extent you declare at the end of your introduction – and I agree that should be published on that basis – but there is a big difference between the grandeur of what is raised in the introduction and what is delivered in the results.

BGD

11, C8155–C8158, 2015

Smaller corrections 1) P17759, L20: It's not clear to me what you mean by "Empirical rules". Empirical relationships? It's the "rules" part that causes me to wonder. 2) P17760 L12: Add citation 3) P17761 L9: "around half" -> "equivalent to around half" 4) P17765 L9: SD undefined 5) P17770 L9: I think 1-\eta would read better if it had an additional set of parentheses around it e.g. ([1-\eta] times... 6) P17771 L2: matters->matter 7) P17782 L7: large-> larger 8) P17783 L15: space needed 9) P17786-17787: The statements at the start of this discussion after the numbered list are not discussion – they are a statement of facts from the past and assertions. They should really be in the introduction with citations, although I suspect most of this text is not necessary at all. 10) Discussion. I encourage you to focus on discussing the findings and insights that are genuinely new. It's not a surprise, for example, that root and leaf carbon equilibrate quickly compared to wood – I don't think that should even be discussed – it is of no use to the reader beyond what is already published elsewhere. If you focus on discussing the genuinely novel findings then it'll be of more use to the reader. 11) P17789 L8: I don't think it's true that "Trees in the baseline LM3–PPA model (version H0 in Table 2) currently do not senesce" – it's just that they don't senesce quickly enough when they're getting really old. 12) P17798: "When consider leaf only" – grammar 13) Table C1 and C2 legend – needs to be improved.

Specific BGD questions 1. Does the paper address relevant scientific questions within the scope of BG? Yes – how to formulate an esm-coupled PPA DGVM and does it perform sensibly 2. Does the paper present novel concepts, ideas, tools, or data? Yes – yes a new model for ESMs 3. Are substantial conclusions reached? Yes – it works 4. Are the scientific methods and assumptions valid and clearly outlined? Yes, very 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)? Yes 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Not yet – just need more work to define what is novel beyond previous work 8. Does the title clearly reflect the contents of the paper? Slighly oversells the paper but

BGD
11, C8155–C8158, 2015

happy to leave it as it is (though a reader will come to a paper with that title looking for global simulations) 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? Some – 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., 11, 17757, 2014.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper