Geoscientific
Model Development
Discussions

Interactive comment on "Terrestrial Ecosystem Process Model Biome-BGCMuSo: Summary of improvements and new modeling possibilities" by Dóra Hidy et al.

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General comments
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This mansuscript describes and documents a new version of the classic and widely-used ecosystem model Biome-BGC. The new version (Biome-BGCMuSo) has a wide variety of new physiological mechanisms, management-simulating routines, soil processes, etc. A number of case studies are described, in which the authors run the new model and assess its performance at a variety of sites. In general everything is well described, and basically clear.

There are a few weaknesses, only one of which I consider critical. First, the processes that have been implemented or improved come across as something of a laundry list, and a bit random; it would be good to describe any common themes that unite them, and better talk about remaining areas of weakness the authors see in the model.

Second, there's no validation or testing of the individual changes. This isn't a show-stopper, but it would have been really useful to run many more simulations with and without each of the new changes. That would have let you quantitatively assess their individual value.

Finally, and most seriously, I'm mystified that the authors are choosing to host the code on their own webserver. GitHub has become the standard for scientific software repositories, but even if you don't use it, for permanence and reproducibility you HAVE to use version control (so, for example, people can send you pull requests or see commit histories) in an established repository. This would massively increase the utility of the new model, and enable it to become a true community-driven model (or, at least, a much more transparent one). I applaud all the work you've done here, including on this website, but really, really urge you to make use of GitHub or another web-based repository hosting service. Note that I have posted the Biome-BGC source code in such a repository (https://github.com/bpbond/Biome-BGC) and would be happy to make this available, and/or turn it over to you.

Specific comments
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1. Page 3, line 4: probably "often is no longer" (concentration-driven runs remain very common in ESM simulations)

2. P. 3, l. 8-9: perhaps cite one of the Friedlingstein et al. papers (e.g. 10.1175/JCLI-D-12-00579.1)

3. P. 3, l. 30: perhaps cite Thornton et al. (2013) 10.1029/2006GB002868

4. P. 4: wow, great summary of Biome-BGC history! One addition might be in line 12: "...and decomposition, and then simulated wildfire effects across a western Canadian forest landscape (Bond-Lamberty et al. 2007, 10.1038/nature06272)." (Completely optional though.)

5. P. 5, l. 11-12: I think this is true, but would add that Biome-BGC also strikes a great balance between process fidelity and tractability: it's relatively easy to use and run, even for non-specialists, but still yields interesting insights. If you agree, perhaps note this

6. P. 10, l. 21-22: More dials and knobs aren't always better. How do you know this is an improvement? Are four layers known to be too few?

7. P. 12, l. 36-37: a thought for the future: an adaptive-timestep algorithm that shrinks the timestep only when necessary

8. P. 27, l. 3-12: nice

9. P. 31, l. 19: "The probable"

10. P. 31, l. 35: "The original"

11. P. 32, l. 32: "The role"

12. P. 33, l. 34-: consider mentioning/discussing PEcAn – see Dietze et al. (2014) 10.1002/2013JG002392