

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

Anonymous Referee #1

Received and published: 9 June 2016

Comments to "Hidy et al., Terrestrial Ecosystem Process Model Biome-BGCMuSo: Summary of improvements and new modelling possibilities".

Overall: This manuscript introduced new developments of the widely-used terrestrial ecosystem model Biome-BGC, particularly focusing on soil dynamics. The modified Biome-BGC (named as Biome-BGCMuSo) incorporated several new modules that were non-existent in the original Biome-BGC, such as multiple soil layers, management, plant physiological processes, and other GHG simulation modules.

I admire the great effort spent on new developments of Biome-BGC. As the authors indicated, the model still has been widely used even nowadays, but unfortunately its development halted for some reason. I really encourage continuing the development

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further; however, I have to say that there is a serious issue in the modified model.

A major problem is that the authors left the issue of negative nitrogen pool unresolved, in favor of the management module (P27 L3-12). This is a red flag in ecosystem modelling! If the authors are anticipated to employ the MuSo as a part of ESM in near future (P3 L2-13), this issue definitely needs to be resolved with a more proper approach. Otherwise, the future projection of nitrogen cycle will be biased by non-equilibrium state.

Most importantly, with the current version of MuSo, the authors cannot claim legitimacy of carbon cycle as well. Biome-BGC is a carbon/nitrogen coupled model. Therefore, distorted nitrogen cycle affects carbon cycle, especially in long-term simulations.

The manuscript provided many good pieces of information about the validation of the modified model, but they are rather meaningless without a proper treatment of carbon/nitrogen cycles. So I don't comment on them at this stage.

The full modification of the model would take time, so I recommend to withdraw the current manuscript and resubmit a new one later.

Interactive comment on Geosci. Model Dev. Discuss., doi:10.5194/gmd-2016-93, 2016.

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