

[General comments]

I appreciate the authors to respond to my comments to the previous manuscript. The revised manuscript has been much improved, but I think there still remains several points that should be clearer, including technical corrections.

- Eq (13): The numbers for pools ($i=4\sim 8$) are defined in L296 and thus not yet defined here.
- Eq (23): how did you get the parameter value for v_{max} ? Nuptake in SM3 looks strongly dependent on the choice of this parameter, but not specified in the text. In addition, in the third factor of " $1/(N_{min} \times KN_{min})$ ", should " N_{min} " be replaced by " SN_{min} "?
- Eq (31): I apologize if I misunderstand, but it seems " $\tau_E = X_i^{-1} \tau'_E$ " should be " $\tau_E = X_i \tau'_E$ ". Please check again.
- Eq (34): CN_i^0 is defined here as the ratio at $t=0$, but defined in Eq (8) as that of last time step.
- L341: In the sensitivity test, you increased/decreased 50% of each N-process. How did you make such changes in each process? For example, it is easy to change BNF by 50%, but I cannot imagine how you made the changes in the processes of PMC, PS, SS, etc. Readers will need brief explanations on this issue.
- Fig. 3o and 3q: In my understanding, since your analysis is based on steady-state simulations, the N budgets should be closed: $BNF + N_{deposition}$ should be comparable with the magnitude of $N_{leaching} + N_{gassing}$. However, in SM3, BNF looks much larger than $N_{leaching}$ (and looks much smaller in SM1). 1000 years spin-up was not enough for the simulations? or other reasons? Do I miss something?
- L368-369, "SM1 and SM2 schemes increased $\sim 12\%$ and 27% ": maybe "SM1 and SM2" is "SM1 and SM3 \sim ".
- L386, "Because of the hypothesis of Nuptake for free, SM2 had the highest CUE among three C-N schemes": This is slightly ambiguous for me. Does "Nuptake for free" mean "no C-cost on N uptake"?
- L446: Maybe "Our results showed ... (Figs. 3a and 3g)" is "Our results showed ... (Figs. 4a and 4g)"
- L473, "plant N uptake is enough for growth": maybe you forget "not".
- L483-L505: I'm still suffering from understanding the logical linking between the first half of this part (general understandings(?), L483-494) and the latter (claims obtained from your analysis(?), L494-505). For example, in the former part, you

mention “the residence time of N in SOM appears to be an important factor”, but such discussion on residence time does not appear in the latter part...

Or you may intend to discuss first the residence time effect on plant production and then the effect of stoichiometry. If so, you should discuss the effect of residence time by referring more to your own results in the first part. The first part sounds like general understanding / background.

- L544- “This mechanism promotes respiration of the faster turnover pools”: This sentence is not obvious for me. Why does the excess-C removal process in SM3 promote the respiration of the faster turnover pools?
- L557- “which is associated with plant competitiveness in SM1 and the respiration of excess labile C in SM3”: how did you get to this conclusion? Readers will need more explanation on this.
- Just a suggestion: As you noted in L513, “The effects of ecosystem N status on C mean residence time, however, has been much less studied than N limitation on ~”, the N impact on MRT has been unclear when understanding model’s behavior. I suppose you can address more in your conclusion section that your analysis framework can quantify the degree of N regulation on C storage capacity, with breaking down it into BOTH primary production and MRT (as a steady state). I think this will give more significance to your work and could be a strong message for readers.
-