

Interactive comment on “Modeling rhizosphere carbon and nitrogen cycling in Eucalyptus plantation soil” by Rafael V. Valadares et al.

Anonymous Referee #3

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The authors apply the MCNiP model to Eucalyptus plantations to estimate the importance of rhizosphere processes to N nutrition in these systems. The inclusion of a plant component to the model is an important development in addition to the other microbial limitations that the authors integrated. The authors use a variety of data sources to validate the model. However, the results presented do little beyond validating the model and there is little discussion of the larger importance of this work. In addition, the main message of this manuscript is unclear given the lack of structure in the paper as well as the numerous language errors throughout.

In addition to the assumptions highlighted by the first reviewer, I am also troubled by the apparent assumption that thicker roots drive a greater rhizosphere stimulation. This assumption is in direct contrast to what was parameterized in the original MCNiP model.

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Detailed Comments:

There are numerous language errors and typos throughout the manuscript. The list below does not include all of these errors.

Abstract: Line 13: change “for instance” to including Line 19: Missing and before SOM formation

Introduction: Page 2 Line 1: The authors use i.e. many times to add another clause to the sentence. This should be put in parentheses with (i.e., N mineralization). Or edit these sentences to include it in the sentence structure.

Page 2 Line 7: Replace high with higher.

Page 2 line 14: Rhizosphere is spelled incorrectly.

Page 2 line 19: This value of 1/3 cited for Finzi et al. 2015 is incorrect. In the top 30cm of soils it only approaches 25% when the rhizosphere influence is assumed to be high.

Page 2 line 31: Schimel and Weintraub as well as the Allison reference did not develop the model to look at rhizosphere processes. Also the model is MCNiP not MSNiP. This error is repeated throughout.

Methods:

Page 4 line 18: Cite Finzi et al. 2015 as well

Page 4 Line 26: Replace of with on.

Page 5 Line 34: The second half of this sentence is confusing and unclear.

Page 6 Line 4: The lack of feedback between plant growth and rhizosphere stimulation of N mineralization is key process that is missing in this model.

Page 8 Line 8: “it was used data”. Same for Line 18.

Results:

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Page 11: This text is unclear but it appears that the model is parametrized to have greater rhizosphere volumes when root diameter is larger. This directly contrasts the assumption in Finzi et al. 2015 that fine low diameter roots are more active and thus have a greater rhizosphere effect.

The results section is mainly validation and does not address key ecological questions nor does it attempt to scale these results up.

Table 1. There are no units for the parameter variables. Same for Table 2.

Figure 7 caption should say kinetic.

Figure 9 caption on instead of in.

Table S1: Why do some variables have dashes instead of values?

Conclusions: These abruptly are presented at the end of the text with little context to gauge whether they were supported. In addition, the discussion does not highlight the importance of the work.

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