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

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Dear Dr. Alam Khairul,

We appreciate your attention to detail and the helpful comments.

Sincerely yours,

Rafael V. Valadares

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Answers to reviewer's comments

Major Comments

1. Comment from Referees: The subject authors addresses here is very important and keeping the broadness of the work and big dataset of the work in mind, I would like to suggest that the manuscript can be published but authors should consider a major revision of their manuscript before they re-submit it in this Journal and elsewhere. Major concerns - The works are mainly based on the data found in Mello et al. (1998), Neves (2000), Leles (2001), Teixeira et al. (2002), Gatto et al. (2003) and Maquere (2008).

Author's response: Thanks for the comment, but it is not clear what the major concern is or what suggested changes here might be. These datasets were used in the first part of the model (root growth). Other references were used later during modeling of C and N cycling in the rhizosphere.

Changes to the manuscript: We will include other datasets in the root growth model, considering the subsequent steps.

2. Comment from Referees: The manuscript is cursorily written. As for example, in the introduction, Page 2, Lines 7, 8, 13, 14, 16 etc. Similar kind of mistakes is there on every page. -The grammar followed in composing the manuscript is not same throughout the manuscript. - The manuscript doesn't read well. - The abbreviations which have already been defined earlier are not followed throughout the manuscript. - The English must be improved before resubmission or the manuscript can be checked or edited by two native English speakers with similar scientific backgrounds/of the same field.

Author's response: We appreciate this review. We have made major corrections to the English, trying to make the text more fluid.

Changes to the manuscript: We will submit the work to a specialized English review

service.

3. Comment from Referees: The sources of the data used for modeling are not written in a recognized format.

Author's response: We will include in the tables of supplementary material S1 and S2 a data source column. Currently, the references are at the bottom part of these tables.

Author's changes in the manuscript: We will adjust the tables S1 and S2.

4. Comment from Referees: Figure presentation must be improved with exact data sources

Author's response: Some extra explanation can be provided in the subtitle.

Author's changes in the manuscript: We have improved this aspect of figure presentation.

5. Comment from Referees: For a better understanding of the results and to compare with other works, the authors can divide the results and discussion into two separate sections.

Author's response: We presented the work with results and discussion together because the article already has a large number of pages.

Author's changes in the manuscript: None

6. Comment from Referees: Conclusions Page 19 line 4: the word should be "Conclusions". -The authors could not come up with the message of the work. Even, the sentences are not clear in expressing any meaning. All the sentences should be rewritten.

Author's response: These sentences will be improved.

Author's changes in the manuscript: We will improve this topic.

7. Comment from Referees: Most of the equations used are not presented with the

definitions of the components

Author's response: Thank you, but we disagree. All the equations with definitions are in the supplementary material.

Author's changes in the manuscript: None.

Minor Comments

8. Comment from Referees: Minor concerns: Page 1, Line 19, 'and' should be used after the penultimate process. 2.1 Parameter estimation Page 8,

Author's response: All possible errors related to language aspects have been corrected with the assistance of a specialized professional.

Author's changes in the manuscript: It will be properly corrected in the final version.

9. Comment from Referees: Lines 7-8 are not clear. 2.1.2 C and N availability and microbial demand Page 4, Lines 27-28: Sentence meaning should be clearer.

Author's response: We are making improvements in the mentioned sections in order to make them clearer.

Author's changes in the manuscript: We are making improvements in the mentioned sections in order to make them clearer.

10. Comment from Referees: Page 6, Line 3:What does it mean by Eucalypt plantation root? Does it mean Eucalyptus plantation roots?

Author's response: Sorry. The model simulates the root growth dynamics.

Author's changes in the manuscript: It means eucalypts roots.

11. Comment from Referees: 2.2 The evaluation of the rhizospheric model Page 8, Line 18: It is not clear what the authors wanted to say.

Author's response: We used the model to simulate real conditions in which we have

field measurements from literature data. Then, we fit a linear model of type y = b1x + b0, having the value estimated by the model in the X-axis and the value observed by field experiments in the Y-axis (literature data). We evaluated the performance of the model through the coefficient of determination (R^2). In addition, we tested the coefficients b1 considering the null hypothesis equal to 1; and the coefficient b0 considering the null hypothesis equal to 0. An ideal model must have b1 not different from 1 and b0 not different from 0. We used the t-test to evaluate these hypotheses.

Author's changes in the manuscript: We will provide additional explanations.

12. Comment from Referees: Figure 4: for giving it self-explained shape, NSE, ME, MAE and RSR should be elaborated again, in the figure title as a legend. Page 11, Figure 6: There are some less-visible numbers. What does it mean? Page 11, Line 12. A full stop is missing.

Author's response: If these are defined in the methods section, then I don't think we need to write them again in each figure where used. Figure 6 is a qualitative assessment. The figure will be edited to show no trace of numbers. Corrections will be made on line 12.

Author's changes in the manuscript: We will edit Figure 6 and make corrections on line 12.

13. Comment from Referees: Page 11, Line 22: Three or there? Page 11, Line 30, 32, 35: Check. Sentences are not clear in meaning. Page 13, Line 41; Sentence meaning is not clear. Page 14, 6: the equivalent or 'equivalent'.

Author's response: Page 11, line 22: There. Page 11, line 30, 32, 35: We will improve the sentences mentioned.

Author's changes in the manuscript: We will improve the sentences mentioned in the final version.

14. Comment from Referees: 2.1 Sensitivity analysis of the ForPRAN model: The

subtitle numbering is not correct. Lines 36-37 are not correct in meaning. (Meaning not clear). Table 1. can be revised as "Values of the input variables used in the model to estimate fine root length, rhizosphere volume and C rhizodeposition

Author's response: Subtitle numbering is correct. Lines 36-37: We will clarify. Table 1.: The values are correct.

Author's changes in the manuscript: Lines 36 and 37 will be reformulated.

15. Comment from Referees: Figure 2. Flowchart of processes represented in the ForPRAN model: Presentation must be improved. Figure 8 and 9: Source: Based on not based in - In, table 1, soil clay contente should be "Clay content in soil".

Author's response: The flowchart seems easy to understand. Anyway, we will evaluate improvements. Figure 8 and 9 and table 1: We will correct these details.

Author's changes in the manuscript: Figure 8 and 9 and table 1: We will correct these details.

16. Comment from Referees: Page 20, Lines 4-5, Is it the source of the data used for the modeling? Page 21, Line 2, Line 31, the meaning is not clear. Eq 19, 20, 27, 28 are not well-presented. Page 27, Lines 24-25, the sentences are not clear in meaning.

Author's response: Lines 4-5: Yes, they are the sources used for the elaboration of this part of the work. Page 21, Line 2, Line 31, Eq 19, 20, 27, 28; Page 27, Lines 24-25: We will improve these parts.

Author's changes in the manuscript: We will improve the less clear parts mentioned considering the next step of the publication process.