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Discussions

Interactive comment on "Annual canopy interception at artificial lowland tropical forest" *by* A. B. Azinoor-Azida and L. Minjiao

Anonymous Referee #1

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General comments

The manuscript focuses on annual canopy interception in a tropical planted forest applying three models. However, the approach is not reasonable. The interception model is validated by the Gash models in addition to measured values, but the model must be validated only by observed data not by other models. Except for the approach, there are a lot of faults in the manuscript, and some of them seem to be difficult to correct keeping consistency of the manuscript. First of all, the structure of the manuscript includes many flaws. The manuscript is not organized that makes it difficult to read, e.g. some parts of methods that should be mentioned in "Methodology" section are contained in "Results and discussion" section. Secondly, there are many wrong and inconsistent descriptions, e.g. misunderstanding of the nature of parameters. Thirdly,

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some methods are not correct probably due to misunderstanding. I admire the effort to collect data in the forest, but I think it is difficult to rectify the manuscript properly, even if it is rewritten completely. I suggest authors to re-construct the entire story to make the best use of the data.

Specific comments

1. 4880: 11-12. Please replace gross rainfall P and stemflow Ts with gross rainfall P_g and stemflow S_f, respectively, because they are represented as P_g and S_f later in the text.

2. 4880: 13-15. This sentence that explains the models should be deleted, as the paragraph mentions measurements but only this sentence describes the models. The next paragraph also describes measurements.

3. 4881: 18-22. The advantage of applying the interception model and the two Gash models is not clear.

4. 4882: 8. Please replace 21 with 12.

5. 4882: 11-13. The objective to visualize 3-D view is not clear. I think the objective is to measure canopy cover, and this sentence should be moved to section 2.5.

6. 4882: 14. Please replace P with P_g.

7. 4882: 20. The raingauge seems to be a storage type. If so, hourly data is not available, and TR in Eq. (3) is constant, i.e. 24 hours. Azinoor and Lu (2010) showed the dependency of canopy interception on TR, and concluded that the interception is sensitive to TR for smaller storage depth, d. But such a sensitivity test is not available if rainfall data is collected on a daily basis. Please clarify the time interval of rainfall data.

8. 4883:14-16. No description was given on the observation period in the earlier section in the text, but 14 April 2012 and 22 May 2012 appear abruptly. The period is shown on 4886: 16-23 but it should be presented somewhere in Methodology sec-

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tion. Please explain how overflow of stemflow was dealt. Was it corrected using any method?

9. 4884: 2. The definition of canopy cover is not correct. I guess authors wanted to ignore under story canopy. But the statement in the text is confusing and not correct. Please insert "," after "c" and delete "that is defined . . . forest fraction".

10. 4885: Eq. (2). "pt" should be replaced with other symbol, because pt is defined as another parameter, i.e. the portion of the gross rainfall which is diverted onto the trunks on 4888: 15-16 and Table 1.

11. 4885: 13. In Table 1 Sc is defined as storage capacity, but on this line Cc is also defined as storage capacity. The correct definition is Sc: storage capacity and Cc: storage.

12. 4885: 19. I have searched using Internet but Azinoor et al. (2012a) was not found. Instead, I found a paper with the same title DOI: 10.1109/ISBEIA.2012.6423016

13. 4886: 1-13. No information is shown on the values of d and TR. I think authors used constant values. Also see comment #7. The difference between d and S is hard to understand without referring to Fig. 3 in Azinoor and Lu (2010). It is recommendable to add the similar figure.

14. 4886: 6. Please delete "g(d) = 0.109dˆ0.58", as the same formula appears on the line 8.

15. 4886: 16-19. Please move these sentences to "Methodology" section.

16. 4886: 21. Does "the minimum gross rainfall" mean daily value?

17. 4887: 1-3. Interception loss for Plot 11 and 12 was 21.31% and 18.89%, respectively, but in Table 2 it is 13.55% and 10.82%, respectively. What is the cause of the large discrepancy?

18. 4887: 8-9 and 21-22. Authors misunderstood the method to determine free

throughfall coefficient p. It must be smaller or equal to unity, and theoretically c=1-p. Please refer to pages 371-374 and Fig. 1 in Rutter et al. (1971).

19. 4888: Eq. (8). The intercept is +0.0014 for Plot 12 that means storage capacity of stem, St is negative. I guess the cause of negative value is large scatter in data. Any other method should be used to determine correct St.

20. 4888: 24-25. Please replace St and pt with pt and St, respectively.

21. 4889: 2. "Another method" is not appropriate expression as no other method is shown earlier. I cannot see what authors intended to describe.

22. 4889: 22- 4890: 9. This part should be moved to "Methodology" section. Fig. 7 to 10 are not necessary and should be deleted. On 4889: 22, please refer to the comment #9.

23. 4890: 26-27. In Gash model canopy saturates with rainfall amount of P'g or greater. I cannot understand what 3 mm means.

24. 4890: 27- 4891: 10. The part is description for applying Gash models, i.e. the method. Please delete it as readers can follow without this part.

25. 4891: 11-15. Refer to the comment #17.

26. 4891: 16-23. Why do authors compare the results with those of Carlyle-Moses and Price (1999) that were obtained in Canada? A comparison should be made with the results in tropical areas.

27. 4892:2-12. Please delete this part as the same equations were shown earlier.

28. 4892: 16-4893: 2. It is concluded that the model is applicable to the forest because the difference between estimated and observed interception is 1.3% for Plot 11 and 16.9% for Plot 12. If this is a major conclusion, what is the significance for application of the Gash models? From another point of view, the model may be very sensitive to parameters, d and TR, but the values are not shown in the manuscript. In this case the

estimated interception by the model lacks objectivity. Optimization or sensitivity test for d and TR is essential upon applying the model.

29. Figures 1 and 3. Letters are too small to read.

30. Figures 5 and 6. I cannot recognize stemflow in the figures. The values are too small to distinguish. I think stemflow should be deleted from the figures by adding some comments on the reason.