Hydrol. Earth Syst. Sci. Discuss., 2, S1491–S1495, 2005
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European Geosciences Union

Hydrology and Earth System Sciences Discussions

Interactive comment on "Throughfall and temporal trends of rainfall redistribution in an open tropical rainforest, south-western Amazonia (Rondônia, Brazil)" *by* S. Germer et al.

S. Germer et al.

Received and published: 8 March 2006

Anonymous Referee 1

(RC = referee comment, AC = author comment)

First we want to thank the referee for his thoughtful and constructive short comments, which we address in detail below:

RC 1: It is essential to mention the dimension of experimental plot in where throuhfall and stemflow were measured, ? **AC 1:** We did mention the maximum distance between throughfall collectors, giving an idea of the dimension of the experimental plot. We will add the maximum distance of stemflow collectors in the revised manuscript.

RC 2: ?additionally, I think it is significant to mention afterward the proportion of the

total area of throughfall collector to the experimental plot for more reliable data. A trough-type collector should be presented as 'wide?length'; for example 15cm?100cm (wide?length) if it was the type I image. **AC 2:** In the revised manuscript we will provide width and length of the opening in parentheses following the total opening area.

RC 3: Why are events separated by two hours without rain? Is there an appropriate reason referring to some literatures? **AC 3:** Events were separated by two hours without rain, because after two hours without rainfall the throughfall had stopped.

RC 4: It would be better if you illustrate the placement of throughfall collectors. **AC 4:** As the collectors were not distributed according to a certain spatial pattern, we do not see the gain in information by illustrating the placement of collectors. Therefore, we prefer not to add one more figure to an already rather long manuscript.

RC 5: As for P2712 L20, what is the value of 24% calculated from? Why was throughfall not normally distributed for 24% of the events? Along with the reason that the median was used in this study, it would better discuss whether there is a deflection or not by comparing the median with the mean or by the illustration of some outliers. **AC 5:** In the revised manuscript, we will add that we used the Shapiro-Wilk-Test to test for normality. As we had to analyze the distribution for 97 events, it seems more convenient to use a test than to illustrate some outliers.

RC 6: If parameter pt is used in the revised Gash model, a more detailed procedure should be expressed here instead of the reference. **AC 6:** We will describe the method used in the referenced study within the revised manuscript.

RC 7: The paragraph P2714 L23-L26 is regarded as the results, therefore, it should be described in 2.3.2 Forest parameters or 3. Results and discussion. Can the author show the scatter diagram for reference? **AC 7:** We present the common method to estimate mean evaporation during events. As we are not able to use this method with our data, we adopt a value from the literature. As our method is to adopt a value, we prefer to mention the value within the methods section. We do not see a gain in

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information by showing the scatter diagram, as we are not going to use it for parameter estimation.

RC 8: As for the equation (4), there was not the description of parameter pt and moreover I think the value determined in P2715 L4-L19 would mean not the canopy capacity per unit cover area Sc but the canopy capacity S. If the method accurately derives the value of Sc, it would need to discuss the difference. **AC 8:** Please see AC 4 and AC 19 given to the referee P. Gerard-Marchant.

RC 9: The method derived the free throughfall is appreciated in the point that it can bring a lot of measurement results at ease, however, the author ought to report the date taken pictures considering the conclusion that the palm is important for high redistribution of rainfall and the temporal pattern is controlled by palms and their leaf growth. **AC 9:** For the method to derive free throughfall the photographs were taken on January the 15th. This date will be added on P2715 L24.

RC 10: Why the equation (5) is expressed here again? There is little explanation for this equation and, as a result, it is likely to cause the confusion with the equation (3). Please explain the equation (5) in detail. **AC 10:** Please see AC 5 to referee P. Gerard-Marchant.

RC 11: Did the result that the month of August and of April was far too wet and dry influence the temporal trend of throughfall? Showing the histogram of gross rainfall is helpful to understand the following all figures. **AC 11:** We relate the temporal trends of throughfall to the presence, growth and movement of palm leaves within the canopy. We did not find any evidence that the rainfall frequency and total rainfall volume per month influence the temporal trends. Therefore, the result that the month of August and of April were far too wet and dry shouldn't influence the temporal trend of throughfall.

RC 12: It is hard to understand the description of 'Maximum 10-min and 60-min'; I think it is not common. Does they mean the maximum values of rainfall intensity were 100.6 mm/h and 57.9 mm/h for 10 minutes and 60 minutes, respectively? It should improve

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the description if possible. **AC 12:** Please see AC 33 to referee P. Gerard-Marchant.

RC 13: In Table 2, the author need to define not only in Table 2 but also in the text that n expresses the number of collectors, and moreover to explain why were there the values of n under 20. It means the loss of data or the data not distributed for 24% of the events as described above? **AC 13:** For the revised manuscript we will add in the methods, that up to the 1st of September we sampled with only 10 throughfall collectors. In section 3.2. we will add, that n<10 for the first 6 events and n<20 for the remaining events results from data loss. These losses are not related to the 24% of non normally distributed events.

RC 14: In the case of negative values for interception loss, the author needs to make the difference of 'event' (P2717 L3) and 'case' (P2717 L5) clear, and additionally, to report with some discussions which of cases did occur more frequently in November: one was the event more than 100% of PG, the other was the throughfall plus the proportional stemflow exceeded rainfall. **AC 14:** There is no difference between 'event' and 'cases' in this context. We just avoided the repetition of the word 'event'. Interception is defined in the first paragraph of the introduction as rainfall minus throughfall and stemflow. Furthermore on P2717 L5 we refer the negative interception to the 25 events to those events where throughfall plus stemflow exceed rainfall. Therefore, if we conclude that interception is more frequent in November, than it should be clear that we refer to the mentioned 25 events.

RC 15: Referring to the consequence described in P2719 L2-L5, it may be beneficial to emphasize the characteristic of this site with high density of young palms. **AC 15:** In the revised manuscript, we will emphasize the high density of young palms within our study site in P2719 L4.

RC 16: In P2719 L20, why did the references, Lloyd et al., 1988 and Ubarana, 1996, be written here? Were not these values obtained in this study? **AC 16:** Yes, the value of 0.03 was obtained in this study. This information will be added in P2719 L19 and we

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will mention that this value is in the range of values found by other authors (Lloyd et al., 1988 and Ubarana, 1996) using photographic techniques.

RC 17: As for Fig.4, interception loss for Gash model is 'modeled' in text, whereas it is 'expected' in figure. The adjective should be corrected by either or should substitute 'calculated' for 'observed' or 'modeled' for 'estimated'. **AC 17:** In the revised manuscript, we will replace the word 'expected' with 'estimated' in Fig. 4 and 6 as well as in P2720 L27.

RC 18: As for Fig.5, the notation of I10max should be explained in text and figure. **AC 18:** Please see AC 12.

RC 19: It needs to be presented that the components of interception loss estimated by Gash model. **AC 19:** In Fig. 5, the calculated interception is plotted as indicated in the caption. As we used 'calculated interception' for the interception inferred from our measurements and not from the Gash model throughout the text, we think that nothing needs to be changed here.

Interactive comment on Hydrology and Earth System Sciences Discussions, 2, 2707, 2005.