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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.

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Richard Keim (Short comment)

(SC = short comment, AC = author comment)

First we want to thank the Richard Keim for his thoughtful and constructive short comment, which we address in detail below:

SC 1: What are the implications of using the median throughfall per collector as the estimate of total throughfall? It is hard not to think that this decision was made to help reduce the number and magnitude of events with TF>100I see two issues with this paired method and conclusion. First, lacking some testing and analysis of the properties of the median and the mean, the conclusion is not warranted. Such an

analysis would need to address the meaning of median in terms of collector size and water balance of a plot or watershed. **AC 1:** Please see AC 5 to the Anonymous Referee 1. As the collectors yield the median or mean throughfall in mm, we do not see how results should be expressed for a plot or a watershed in a different way. Of course we could calculate the difference of the sum of median and mean throughfall per study period, but we still would not know which amount would be the right one. In fact, we used the median simply as a resistant estimate of throughfall in face of non-Gaussian behavior; there is no mystery or attempt at tweaking the data.

SC 2: Second, and most importantly, the high spatial variability during some times of the year and during high-intensity rainfall was apparently not sufficiently sampled to robustly estimate the mean. Given that traditional averaging is equivalent to weighted averaging with all weights equal, and given that there is no way to estimate spatial pattern necessary for assigning other weights without intensive sampling with a large number of collectors, the simplest conclusion is that more collectors are needed. **AC 2:** We agree: in hindsight, there should have been more collectors, and had we used more collectors, we would have gotten a result that would have suggested the need for yet a larger n, because there will never be such thing as too many collectors. Nonetheless, in a pilot study using collector 1 to 5 from 21st of January to 26th of February 2004 and collector 1 to 10 from 27th February to 3rd March 2004, we sampled throughfall to estimate variability, which we used, in turn, to estimate the number of collectors required to estimate throughfall in our site with a certain precision: we came up with n=20 at alhpa=0.05 (Thimonier, 1998, equation 1). It so happened that collectors responsible for the high variability were not included in the pilot study, such as collectors 17 and 19, or collector 7 for most of that period. This we did, but we still think that it is equally, if not more important to understand the causes of the variability. A better understanding of throughfall variability in space and time might provide improved sampling designs in the future.

SC 3: Are the values presented in Fig 2 correct? For example, did the throughfall in

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collector 14 really average about 6 standard deviations greater than the mean? If these values are correct, I think the confidence intervals of the mean (median) throughfall for each storm would be so large as to make it clear that 20 collectors simply were not enough. **AC 3:** The numbers are correct. Collector 14 yield for most of the study period 100 to 200 % throughfall. Please see AC 2.

Reference: Thimonier A. 1998. Measurement of Atmospheric Depositon under Forest Canopies: some recommendations for equipemnt and sampling design. Environmental Monitoring and Assessment 52: 353-387.

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