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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Land use change effects on runoff generation in a humid tropical montane cloud forest region" *by* L. E. Muñoz-Villers and J. J. McDonnell

Anonymous Referee #2

Received and published: 5 June 2013

This manuscript is a very interesting study about run-off differences under different land uses in a humid tropical montane cloud forest region. In addition to pasture and mature forest, also a secondary forest catchment was studied. This is of high value as hydrologic process studies from secondary forests are underrepresented in the literature. The study was well elaborated and results are clearly presented. I suggest considering this manuscript for publication after minor improvements.

General comments:

1. Throughout the text averages are given, but it is not said what follows after the +/-. . .

is that SE or SD?

2. The usage of different terms for the same thing makes the reading of the text (and Figs or Tabs) quite difficult. For instance, I suspect that baseflow in Table 4 and Pre-event water in Table 5 present values from the same samples. Or "storm runoff" (P5285, L24) seem to relate to "stream water" in Table 4. Anyway, baseflow is also stream water (see Table 4).

3. Table 4 and Figure 4 show the same data for EC and D18O. There is no need to present both.

Specific comments:

P5271, L5-7: A decrease in interception and transpiration can modify the water cycle but "soil hydraulic properties" can not. "decreases in soil hydraulic properties" might so, but what would be these decreases? Please clarify.

P5273, L12: "<25 ha" that could be anything from 0 to 24.9. . . ha. Please be more precise.

P5273, L15-22: In this part catchment and soil characteristics are reported in present tense and thereafter in past tense. The same happens on the following page. Please be consistent.

P5274, L24-25: Annual rainfall is derived from which years? Probably it's an average. What would be the SD? Add years, average and SD.

P5274, L25 and 28: What are high and low intensities? Could you provide figures for these?

P5275, L22: Are the data from July 2005 to June 2008 used at all in the manuscript? If so it should be specified here, if not there is no need in reporting that there are data from this period.

P5276, L4-6: The order of the parameters should equal the order below where details

of these parameters are presented.

P5278, L10: The “weighted sum” was weighted by what exactly?

P5281, Sec. 3.1: For the reader it would be helpful to get to know whether there were precipitation differences between these two years, as some of the analysis were done only on data from the second year.

P5282, L27: “FI indexes” as I understand this would read “Flashiness Index index”. Please correct.

P5285, L11-12: “Peakflow discharge” are these mean hourly values or discharge peaks for shorter periods?

P5285, L25-27: Isotope ratios from forest runoff were similar to what? “variation” or “range”? I don’t understand what was compared.

P5290, L10-11: Even though their have not been a lot of studies, some work was done since the work from Bruijnzeel (2004). I suggest to cite and discuss the following references:

- Schrumpf, M., Axmacher, J. C., Zech, W. and Lyaruu, H. V. M. (2011), Net precipitation and soil water dynamics in clearings, old secondary and old-growth forests in the montane rain forest belt of Mount Kilimanjaro, Tanzania. Hydrol. Process., 25: 418–428. doi: 10.1002/hyp.7798

- Hassler, S. K., B. Zimmermann, et al. (2011). "Recovery of saturated hydraulic conductivity under secondary succession on former pasture in the humid tropics." Forest Ecology and Management 261(10): 1634-1642.

- Zimmermann, B., A. Papritz, et al. (2010). "Asymmetric response to disturbance and recovery: Changes of soil permeability under forest–pasture–forest transitions." Geoderma 159(1–2): 209-215.

P5291, L13 and P5293, L8: Have the authors read these articles? These studies were

done in different catchments in very different places in Brazil! Please correct.

P5291, L11-20: I think it would be worth to discuss the influence of catchment size on runoff behavior. For instance, the studied catchments by Germer et al. (2010) are much smaller than the ones studied in here. And as one of the manuscript authors stated in one of his previous papers, catchment size can be inversely related to event water contribution:

Brown, V. A., J. J. McDonnell, et al. (1999). "The role of event water, a rapid shallow flow component, and catchment size in summer stormflow." Journal of Hydrology 217(3–4): 171-190.

P5292, L7-10: If the reason would be lower rainfall infiltration in pasture compared to forest, then this it might be possible to verify by calculating the seasonal water budgets, as lower infiltration results in increased stormflow.

P5293, L3-6: Why doesn’t it suggest saturation excess overland flow? As long as only infiltration or Ksat (?) was measured at one depth (or soil surface?) no discussion is possible about whether it is rather infiltration or saturation excess overland flow. By-the-way, as Ksat methods further details were only published within a thesis, I think some more details should be reported in this manuscript.

Figures:

- Put “-1” as superscript and indices as subscripts

Fig. 1

- It is not explained in the caption what is meant by: TG1, VPtg, VPco, BS1, BP1, SECP

- It should be indicated that numbers in the right plot are heights (above what?).

Fig. 3

- Caption: “hourly values” should be “hourly depth”

- P and Q are not on the x-axis! The authors could change the text to e.g. Hourly depths of rainfall, P (grey bars). . .

- Last line of caption: . . .period studied. Please indicate what was studied.

- It is not possible to read the year on left hand plots.

Fig. 4

- In the figure it is “soil-lysimeter water” and on other figures/tables and the text it is just soil water. Please be consistent.

- Explain what the whiskers of the box-plots represent, as there is no standard usage. Why are there no whiskers for the rainfall and baseflow?

Fig. 6

- In the caption change as in text (e.g. P5286, L6): (D18O) to (D2H, D18O)

- Different scale according to what? Add “to storm 1 and 3”

Fig. 7

- In the caption change as in text (e.g. P5286, L26): (D18O and EC) to (D2H, D18O and EC)

- Use the same signatures as in Fig. 6 (e.g. grey bars for rainfall)

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 5269, 2013.