

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 #3

Received and published: 7 June 2013

This paper presents a detailed, well-designed comparison of runoff generation processes in catchments with contrasting land use histories. Forested mountain catchments like these are important to water supply for many regions in the tropics, and more studies geared toward understanding the effects of deforestation on the hydrology are needed. The researchers applied numerous field measurements and analyses to interpret the results, and this paper represents a solid contribution. The paper is generally well-written and well-organized and should be published with minor revisions to improve clarity and add missing information. Suggestions are listed below:

Main comments:

C2369

The analysis of EC hysteresis that is described briefly in section 3.3.5 needs more explanation if it is to be included in the paper. At the least, please add a figure for illustration of the results, and a description of the technique and how hysteresis loops are interpreted, with references, in the methods section.

In section 2.1, and table 1, the soil profiles are briefly discussed and physical parameters are given, but there is not enough description of how they were measured. More detail about differences in the subsurface properties in the catchments is needed, as it becomes part of the explanation of the results later.

In the Discussion, the authors note that undisturbed and regenerated forest catchments are important for environmental services to society, however, it is not clearly explained which hydrologic characteristics are ‘better’ in forests vs. pastures. It is implied that the forests, despite their higher ET and canopy interception, have greater storage, but not explicitly stated. Further discussion, and clarification of ideas in the conclusions would be helpful.

Suggested edits: p. 5284, lines 19-24: Condense to one sentence – ‘five storms during the wetting up cycle were suitable for analysis’; if necessary, a dissertation could be referenced for the details.

p. 5286, lines 21-24: It is not clear what is being explained here – do authors mean to say that 18O and 2H results were similar?

p. 5287, line 11-12: suggested grammatical correction “. . .except for Storm 5 during which the pre-event water was calculated to be, on average, 22% and 39% of soil and ground water, respectively (Fig. 7).”

P 5287, line 16: The wet season was described as being from May through October, and figure 3 shows some rainfall during May-July. I’m curious as to why the wetting-up period did not start until August?

Discussion, line 13: the 2-year runoff series is not shown, please add a reference here

C2370

if it is published elsewhere.

p. 5290, line 16: please define "intensity of land use".

p. 5292, line 18: "storm hydrograph separation analysis. . . demonstrated. . . increases of rainfall-runoff event ratios" which parameter is being referred to here?

p. 5294, line 25: "leaded to" should be "led to"

Figures and tables:

Figure 5: The isotopic compositions of rainfall would not be expected to differ much between sites as close together as these, and there are so many overlapping data points on the plots, it is difficult to see the differences. The figure might be more effective as a 4-panel figure, with each panel showing one type of water with points for each of the 3 sites, for example, the soil water samples for all 3 sites on one plot, with the meteoric water lines.

Figures 6 and 7 show some of the same information, are they both necessary? Can the figures be re-drafted to show only the unique information given by the 2- and 3-component hydrograph separations? or could the information in one of the figures be described in a table?

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