

Interactive comment on “Factors influencing stream water transit times in tropical montane watersheds” by L. E. Mu noz-Villers et al.

Anonymous Referee #2

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This manuscript aims to assess the control of physical properties on mean stream water transit times in a tropical setting. Although the analyses in the paper are very simple and basic techniques are used, little data from these environments are currently available and this work makes an important contribution in that sense. I would recommend the work for publication, considering the following points below:

The authors comprehensively discuss their results in light of other findings elsewhere. However, there is little discussion on the methods used and the caveats that come with these. There are three major issues that would be good if discussed. 1) Overall, there is a focus on base flows as these were sampled only. However recent work has shown that there can be a strong variability between MTTs of low and high flows. There is no mention of this in the discussion. I think this should be highlighted there and how

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this relates to potentially holding/breaking down relationships between physiographical properties and MTTs during storms vs base flow. 2) One other key point is that the authors found no distinct differences in the isotope signatures of the streams, yet their model results have a large range of implied MTTs. How does this affect the uncertainty in the results? And is this simply a result of the different models which were used (which have different bias)? 3) Many of the sampled subcatchments are nested and only stream samples for isotope data were taken. There is no indication of the relative contributions of runoff from the different parts of the catchment. For example, if the headwaters are contributing more than other subcatchments (could very well be considering the differences in precipitation), then this could bias the results in favour of the processes in those areas.

The terrain analysis comprises of many standard techniques, hence I think section 2.4 can be condensed significantly.

I would recommend to use either 'watershed' or 'catchment' consistently throughout the manuscript

Some other minor comments:

10976, L7: change to 'and related these to catchment'

10976, L20-22L This sentence not clear. It suggests there is an effect of scale, while the results have shown there isn't. Greatest difference between scales, or within the two groups?

10977, L17: needs rephrased. Change 'first' to 'for the first time'?

10978, L8-9: are these of the same order of magnitude as Munoz-Villers and McDonnell 2012?

10979, L11: change to 'the majority of monitored headwaters are located'

10980, L3: ET not known as this elevation?

10981, L13: What kind of correlation? Can you show what the measure of fit is?

10982, L4: Explain why this is the best method?! e.g. why not nearest gauge, something along the lines of elevation corrected Thiessen polygons

10982, L12: Why this approach when many others around? Does it fit your data best?

10984, L6: not 'created' but 'derived'

10984, L14: which criteria were used for selection?

10984, L16: change 'description' to 'descriptions'

10984, L17: $n = 3$ in total or 3 at each site?

10985, L15-16: How does this relate to long term (or even 2006-2010) data? Could there be bias in your data as a result?

10985, L24: p value results of which test?

10986, L5: lagged by how much?

10986, L8: not statistically significant at all sites? And again, which test results?

10986, L10: But many of your sites are nested. Have you considered that this could be a result e.g. of the headwaters contributing the majority of water? Do you have any indication of how much water is coming from which parts of the catchments spatially?

10987, L10: the highest proportion of what?

10987, L14-15: This sentence should be moved to methods - and explain why this is important?

10991, top sentence needs rephrased

10992, L17: change 'has' to 'have'

Figure 1: This Figure is currently all a bit busy and it is difficult to make out the sub-

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catchments. Why not focus on the study area only as the lower part of the catchment is not relevant for the study here. Also, what do the elevation labels refer to in A?

Figure2-3: Swap order of Fig 2 and 3 - in the text you first refer to Fig 3, then 2.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 10975, 2015.

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