Hydrol. Earth Syst. Sci. Discuss., 12, C6817–C6819, 2016
www.hydrol-earth-syst-sci-discuss.net/12/C6817/2016/

Hydrology and Earth System Sciences
Discussions

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

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Received and published: 18 February 2016

Anonymous Referee #1

The paper presents a comparison of mean transit time (MTT) between multiple watersheds in a tropical montane region aiming to evaluate factors controlling stream transit time. The issue addressed in the paper is one of the main concern in understanding hydrological process including sources, flow paths and storages. The paper shows that slope and permeability observed soil-bedrock interface other than land cover are the key factors controlling MTT in the tropical montane area. The paper is well written with significantly new knowledge. I recommend its publication on the Hydrology and Earth System Sciences after properly addressing the following issues:

Reply: Thank you very much for your positive recommendation. Please find our replies to your comments below.

(1) P10989L4, the authors state that short MTT were most strongly related to depth to soil-rock interface particularly for slopes dominated by depth > 2m. The result is derived by a series of divide-points including 0.5m, 1m, 2m. Is there any reason for such classification?

Reply: In L2-L4 we stated "a strong positive relation was observed between MTT and depth to soil–bedrock interface (particularly for hillslopes dominated by depths to bedrock > 2 m; Fig. 5f)", i.e. longer MTTs were related to deeper soil-bedrock interfaces. We will re-phrase this sentence to make it more clear. The classification was based on the range of soil-bedrock depths observed. Hence, we decided to divide this variable in 4 classes: very shallow (<0.5 m), shallow (>50-100 cm), moderate deep (100-200 cm) and relatively deep (>200 cm) soil-bedrock depths, to test their influences on stream MTT. We will add this information in Section 2.5.

(2) In the paper, three functions (g (τ)) have been used to estimate transit time model including Gamma, Exponential and Dispersion. Although model parameters have been listed in Table4, it is perhaps not clear to the readers without specific formulas displayed.

Reply: Agreed. Between L15 and L16 in section 3.3 of Results, we will mention that these TTD models yielded the best results for estimating stream MTT, and we will refer the reader to the supplementary information for the corresponding formulas.

(3) Conclusion part, the influencing factors for MTT in variable-area watersheds should be further justified.

Reply: We will include this in our Conclusions.

(4) P10995L16ïijNtowards a better understanding "on" the hydrology. . .

Reply: Thank you for highlighting this. We will change "on" for "of".

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