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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Land use alters dominant water sources and flow paths in tropical montane catchments in East Africa" *by* Suzanne R. Jacobs et al.

Anonymous Referee #4

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This study investigates the effects of land cover on water sources and flow paths in a montane catchment in East Africa. This case study could be important in filling in the gap of hydrologic knowledge in an understudy landscape. However, I have serious concerns about the suitability of the collected data to complete the analysis conducted by the authors and to provide evidence to answer the research questions. In addition, the manuscript is vague and incomplete. I believe the manuscript is not ready for publication. Below are some specific comments: 1) Given that, the available isotopic data is only 1.5 years long the authors should provide an assessment of the uncertainty in the computed MTT? The performance of the fits by the Gamma and EPM are actually similar yet the MTT for OUT_S15 was different between these two models. How do

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Discussion paper

you explain that? It is not clear how the authors chose the Gamma and EPM functions. Did they consider what model had better constrained parameters? In addition to the modelling shortcomings, how can MTT estimates calculated from 1.5 years of data provide information about the hydrologic impacts of different land covers? I wonder if a first step should be a hydrometric analysis that compares land covers and that can informed the findings form the MTT in light of physical processes. In addition, there might be interesting patterns in the isotopic data alone in terms of means per location, per season, comparisons across soil, stream, groundwater, and precipitation that would allow contrasting the different land covers. I am looking a figure 3 thinking: there is many data that have not been appropriately described in the paper. My point is that the isotopic data can we used on other ways different from in convolution equation for MTT. 2) The organization of the paper and its content is insufficient. a. The introduction is no short and does not set up the problem well. It is not clear what would the contribution of this study be nor how it fits with previous literature. b. Methods: It to short and refers the reader to a paper in review. A more comprehensive description is in order. The methods indicated that precipitation was estimated using Thissen polygons based on the information (I assumed, from the nine tipping buckets) however the results from this analysis is never presented in the results section. How variable is precipitation in space and time in this system? c. The result section is vague. For instance on 3.1. (Solute concentrations) the authors do not describe any one solute but instead talk all simultaneously as high or low. The result sections should include some actual numbers so that the reader knows what low or high mean. Likewise, there is no information in the results about how the values for the isotopic concertation vary in space and time per precipitation, stream, soil water, etc.

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