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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Where does streamwater come from in low relief forested watersheds? A dual isotope approach" *by* J. Klaus et al.

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The Klaus et al. manuscript presents the isotopic signatures of different water sources affected by evaporation, which are further used as end-members to identify runoff generation mechanisms in gentle slopes catchments in South Carolina, USA. I found the manuscript interesting because it provides new information about the water cycle of forests located in a low relief topographic setting. I have some comments that I would like the authors to address, which may help to improve the contents and potential impact of the paper.

Methods. Section 2.2. I will second Dr. Markus Hrachowitz comment with regard to the measures taken to prevent evaporation/fractionation of the precipitation and through-

fall samples (see also my comments below). Please provide this information in the manuscript.

Section 2.2, Page. 2619. Please also mention the sampling period over which the stream water, riparian groundwater, throughfall, and lateral flow were collected.

Results. Section 3.1, Page 2620. The high positive O18 and 2H values reported for precipitation surprise me somewhat. In particular, there is one very enriched value that plots below the LMWL (Figure 4, panel a), which looks suspicious to me and makes me wonder if that sample could have been affected by evaporation. I would then suggest calculating the d-excess values (see my comment below) of all samples as a way to identify evaporatively impacted samples. In addition, please check the expected range for δ18O and δ2H isotope ratios at your study site or a nearby place. If the samples turn out to have been affected by evaporation, I suggest you to simply remove them from the data set.

Section 3.2. Page 2620. I think it is very important to include in this paper a figure where the GMWL is plotted together with the LMWL; given the climatic conditions at your study site, the latter likely has a lower slope and intercept as compared to the GMWL. This would also be very useful for future comparisons across sites with similar climatic conditions.

Further, I think the authors have a great opportunity to make use here of the Deuterium excess (d-excess) parameter as a measure of the degree of evaporation enrichment. D-excess is a measure of the relative proportions of O18 and 2H contained in water, and can be visually depicted as an index of deviation from the global meteoric water line (GMWL: d-excess =10) in δ18O versus δ2H space (Dansgaard, 1964). Hence, I encourage the authors to present in this section the d-excess values of the different water cycle components (stream, throughfall, etc.), and also to refer to them in the Discussion (Section 4.1).

Figures. Figure 3. Streamflow is plotted in l/s in log scale (left y-axis) in panels b, c

and d; however, for consistency and to facilitate comparison with rainfall (panel a), I suggest to plot the streamflow in mm/d. I observed that panels c and d have the same scale in the right y-axis, but I am not sure if panel b does. If not, please correct.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 2613, 2014.