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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Studying catchment storm response using event and pre-event water volumes as fractions of precipitation rather than discharge" *by* Jana von Freyberg et al.

Anonymous Referee #2

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Review for manuscript Manuscript ID: HESS-2018-401; Studying catchment storm response using event and pre-event water volumes as fractions of precipitation rather than discharge

Best authors and editors, Thank you for the possibility to review this very interesting manuscript, and apologies for the delay in my review.

The authors present a hydrograph separation studying the stream water sources in an experimental Erlenbach catchment in Switzerland. The work builds on an advanced field laboratory, enabling high-frequency determination of isotope composition in stream water and precipitation used in identifying pre-event and event water com-

position, respectively. Authors present an eight-month long dataset of isotope and hydrometric measurements for flow and precipitation, supplemented with groundwater level and soil moisture data as proxies for catchment wetness. As a subset of this data, they analyse 24 storms in greater detail. The results show the advantages in exploring the pre-event and event water contributions as a fraction of precipitation, not total streamflow as is typically done. Using this approach, the authors were able to infer novel insights to catchment controls on streamflow generation. I particularly enjoyed section "3.4 fingerprints of catchment response" in which the authors put forward interesting hypothesis to be tested by the hydrological community.

The manuscript is written with flawless English, and is well structured and presented. In my opinion both the collected and dataset and the following analysis are novel and of high quality, and therefore a great contribution to the hydrological sciences. I recommend this work to be published in HESS, and provide some minor remarks below.

comments: P4L13: I would recommend the authors to better acknowledge and discuss prior work studying the Qe/P ratio in the introduction. Before this chapter, I had the impression this is being done the first time in the presented manuscript. P5L5 what do you mean by "saturated soils"? groundwater table is at ground level? Or that the soil type is prone to saturation? I presume that the extent of saturation would vary seasonally, so a static map for it seems simplified. Fig.1: add a scale, the degree axis are not very intuitive of the catchment size P7L16: concentrations -> ratios? P8L10: how is Q for each event defined and calculated? P10L1: add spacing for dates in all occurences? P10 L15: I don't understand how the 4-hour peak Q 0.11 mm is lower that overall Q 0.5 mm. How is 4-hour peak Q defined? Fig. 4: should y-axis be delta 18O? P10L 24: how about the point on the far right in both a) and b) plots? That deviates substantially from the 1:1 line. P15L10 and table3: I don't find Qpe/Q data in table 3, though discussed in the text P17L6: I see this conclusion somewhat inconsistent with your data analysis so far. You suggest that the Pe could be explained by contraction and expansion of saturated areas, i.e. the antecedent conditions, whereas before you

demonstrate and discuss how the Pe is mainly a function of the storm characteristics.

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