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Interactive comment on "Impacts of rainfall features and antecedent soil moisture on occurrence of preferential flow: A study at hillslopes using high-frequency monitoring" *by* Z. Peng et al.

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This paper tried to evaluate the impact of rainfall features and antecedent soil moisture on occurrence of preferential flow on slope in north China by interpreting response of soil moisture to rainfall. The result showed that occurring frequency of preferential flow was averagely 40.7% and the authors concluded that rainfall amount was the dominant driven factor to occurrence of preferential flow, while average intensity was in second. Although the conclusions are not innovative, the field observation data is reliable and results of this paper are valuable to further understand the mechanism of preferential

flow occurrence.

Nevertheless, it is my feeling that the authors did not stress enough the limitation of previous researches and their relations with the major objectives. And I also concern about the method that the authors used to analyze the correlation between rainfall features, antecedent soil moisture and frequency of preferential flow. It is not clear to me that how each rainfall feature was divided into 15 sub-ranges with non-uniform increments (P8L5). In my opinion, the method of dividing would determine the fitting curves and R^2, and so the results depend somewhat on the inclination of the authors. Therefore, the authors should provide more explanation to show the method is valid.

As a general comment, I think that the paper requires major revision before being published.

I have listed in the following a number of issues that should be addressed in this paper before publication.

1. "Eighty four groups of soil samples were collected from the profiles at all sites 5 except FH4. "(P4L5). The reason should be explained why FH4 was excluded.

2. What is the accuracy of the rain gauges?

3. The slope gradient and aspect, canopy coverage and elevation of each site are suggested to add to Table1, which will help readers to understand the differences of the sites. And more explanations should be given why the sites S1H1-S1H5 and S2H1-S2H3 were set, which seem very close to each other according to Fig1.

4. What the measurement radius of the probes of TDR? The information is important because only the preference flow occurred in this range could be interpreted by the variation of observed soil moisture.

5. What is theoretical basis that a 0.002 cm3/cm3 threshold was set to quantify the responses of water content to infiltration according to a bunch of studies, given accuracies of the applied TDR probes were 0.025cm3/cm3. Whether did previous studies

(Blume et al., 2009; Lin and Zhou, 2008) use the TDR probes of same accuracy?

6. The null hypothesis of the Kolmogorov-Smirnov test is usually defined as that the sample is drawn from the reference distribution (in the one-sample case) or that the samples are drawn from the same distribution (in the two-sample case) (such as in XLSTAT). However, "significant difference between every two distribution was set as the null hypothesis in this paper"(Line102-103). Which software was used to carry out the tests?

7. It is difficult to read Fig4 and I suggest change it to a table.

8. "Contents of organic matter, clay and silt generally decreased with depth, leading to higher saturated hydraulic conductivity. Detailed information at each depth was not listed in Table 2, but was covered by the ranges."(P4L11-12). What is the sampling depth of the data in Table 2?

9. The rainfall amount difference between site FH3 and S2H1 is larger than 180mm from 2014/8/22 to 2014/10/31 (Table3) but the distance seems only about 500m. Is it because the logger at S2H1 failed from 2014/10/14 to 2014/10/31(P5L27)? This should be added as notes of Table3.

10. Fig1 is not contour map but a DEM map.