

Interactive comment on “Runoff reaction from extreme rainfall events on natural hillslopes: A data set from 132 large scale sprinkling experiments in south-west Germany” by Fabian Ries et al.

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Dear reviewer,

Thank you for reviewing our manuscript and the valuable comments and recommendations to our manuscript. Please find your questions and comments marked as e.g. “R1.C1” followed by our reply marked as e.g. “R1.A1” including a description of changes in the manuscript.

Best regards Fabian Ries (on behalf of all co-authors)

C1

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R1.C1: My main suggestion is to try hard to add further data on topography (slope angle, slope aspect, elevation) and plant traits (LAI, vegetation height, biomass dry weight, ...).

R1.A1: Some of the requested data on topography (“Elevation” and “Slope”) and vegetation (“Plant_coverage”) are provided in the data file “1_site_data.txt”. We will add available information on slope aspect and vegetation height to the data file “1_site_data.txt”. LAI and biomass dry weight were not measured explicitly in the field, therefore we are unfortunately unable to provide this particular information.

R1.C2: I like the test of rainfall distribution and the fact that the study addresses real rainfall provided at several points in field plots by using precipitation gauges. These information are very valuable to trust the data because of knowledge on drop energy. I would suggest to add a table in the manuscript following “site-data.txt” so that people quickly can check if the data is suitable for the research questions of the respective reader, especially from the biological characteristics point of view.

R1.A2: We did not measure the kinetic energy and size of the simulated raindrops but we refer to another study using a very similar sprinkling system (see chapter 3.1 “Water supply and rainfall simulations”) that confirm near natural rainfall conditions of our sprinkling devices. Observations of the all rainfall gauges and rainfall collectors are included as cumulative values for the individual experiments in table “2_event_data.txt” and in minute time interval in “3_experiment_time_series.txt”. Concerning further information on general characteristics of the individual experimental sites please see our reply to R1.A1.

R1.C3: Pastures are grassland, so at least provide estimation of vegetation height at the timing of rainfall experiments (because of interception and influence on rainfall distribution on the ground). It would be helpful to have some key species mentioned or perfect if you have a vegetation survey of the plots (not mandatory, but any information on that might be very helpful for the user of your data).

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R1.A3: As mentioned in response to comment R1.C1 we will add information on the vegetation height at the timing of the rainfall experiments in data file “1_site_data.txt”. We agree that a vegetation survey and especially the identification of indicator plants could help to classify the individual pasture plots concerning general site-specific soil moisture and wetness conditions. Unfortunately, we cannot provide specific taxonomic information on plants and vegetation of the experimental plots as they were not collected in the field.

R1.C4: Please discuss in a broader context which soil parameters (i.e. soil organic matter SOM, soil stone content) or plant parameters might be important and/or influence infiltration behavior as well as water storage capacity. Also address the kinetic energy of your water compared to natural rainfall and how this might impact your results, infiltration, and possible hydrophobic effects - this helps the reader to better understand the complex issue of sprinkler experiments. To cover abovementioned issues I recommend to have a look into papers from Abdallah Alaoui (CH) or Christian Newesely (AUT) or Georg Leitinger (AUT) and many others. Not necessarily cite them but to gain a broader view on the addressed issue.

R1.A4: We are aware of the numerous factors that influence runoff generation during extreme rainfall conditions. Therefore we tried to measure a wide range of parameters describing the conditions of the experimental plots. Concerning the kinetic energy of rainfall drops see our reply to R1.A1. Hydrophobic conditions were not observed in any of the 23 experimental sites. We will include a respective comment in the revised manuscript to section “3.4 Field soil description and laboratory analysis”. Soil organic matter (Vol-%) and estimated stone content are available for most of the experimental plots. We will add respective data to the file “1_site_data.txt”.

R1.C5: Figure 1: what do the hatched areas mean? (I assume to highlight which soil types have been investigated / covered, but then: why is there a red dot in a hatched area?). Please clarify!

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R1.A5: The hatched areas represent common soil types in the federal state of Baden-Württemberg according to the soil map BK 50. This information is missing in the figure description and will be added in the revised manuscript. The red dot represents an experimental site with a certain soil type which was not represented by the soil map BK50 but identified in the field.

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