Nonlin. Processes Geophys. Discuss.,
doi:10.5194/npg-2016-76-RC2, 2017

Nonlinear Processes in Geophysics
Discussions
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Interactive comment on "Quantifying the changes of soil surface microroughness due to rainfall-induced erosion on a smooth surface" *by* Benjamin K. B. Abban et al.

Anonymous Referee #2

Received and published: 22 February 2017

GENERAL COMMENTS This study analyses soil surface roughness evolution after a single event of simulated rainfall with three different intensities, namely 30, 60 and 75 mm/h. Two indices used to describe the magnitude of soil surface roughness indicate increasing values of this variable after rainfall addition.

In my opinion this manuscript does not contain significant results. This is because the experimental work has been limited to one rainfall event, and this is .obviously a main weakness in any study about soil surface roughness evolution (either increase or decay).. In addition, authors claim that the results are new, as they state that i) "Findings show a consistent increase in roughness under the action of rainfall for initial microroughness length scales of 2 mm" and ii) "This contradicts existing literature where a

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Discussion paper

monotonic decay of roughness of soil surfaces with rainfall is recorded for disturbed surfaces". However, please note that i) again, the increase in roughness (instead of a expected decrease) has been found only for the first event. What about successive events); results are not reported. ii) Increases in soil surface roughness after simulated surface rainfall and for disturbed soil surfaces have been previously reported (Please, see Vidal Vázquez et al., 2008. Assessing soil surface roughness decay during simulated rainfall by multifractal analysis. Nonlin. Processes Geophys., 15, 457–468). In this paper the evolution of the surface of three different soils was studied during successive events; two of the studied soils showed soil surface roughness increased after the first event (similar to your results)e second, but it decreased after the second and successive events; the third soil studied showed scarce trend to either increasing or decreasing surface roughness values following successive rainfall events.

SPECIFIC COMMENTS The obtained results should be put into context, with relevant references. This opinion is based in the fact that relevant studies about soil surface roughness, (including the previously cited Vidal Vázquez et al., 2008. Nonlin. Processes Geophys., 15, 457–468, and Kamphorst et al. 2000. Soil Science Society of America Journal 64(5): 1479.1458. By the way, these two manuscript present examples of soil surface roughness assessed by laser scanner as in your work. In the first work quoted (Vidal Vazquez et al., 2008) the magnitude of the roughness is not very different from that in your work and in the second (Kamphorst et al., 2000) several plots also are representative for conditions of rather low values of roughness.

In my opinion, adding more experimental data (successive events) would allow that this manuscript reaches international standards.In addition, any revision of this manuscript should address the following points: - Text should be ameliorated the text, which is not precise and provide a more clear presentation. Main corrections are expected in abstract, objectives and discussion and conclusion sections. - Mechanisms and reason for the increase in soil surface roughness after one event simulated rainfall. - There are also unnecessary figures, regarding the experimental setup, as the methodology

employed has been largely described before. - Soil composition and main characteristics should be also reported in the material and methods section. - Other significant roughness indices should be addresses, in addition to random roughness and cross over length.

Based on the above I recommend to the editor either major revision or rejection of this manuscript.

Interactive comment on Nonlin. Processes Geophys. Discuss., doi:10.5194/npg-2016-76, 2017.