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Interactive comment on "Aggregate breakdown and surface seal development influenced by rain intensity, slope gradient and soil particle size" *by* S. Arjmand Sajjadi and M. Mahmoodabadi

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Aggregate breakdown and surface seal development influenced by rain intensity, slope gradient and soil particle size

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Abstract

Aggregate breakdown is an important process which controls infiltration rate (IR) and the availability of fine materials necessary for structural sealing under rainfall. The purpose of this study was to investigate the effects of different slope gradients, rain intensities and particle size distributions on aggregate breakdown and IR to describe the formation of surface seal. To address this issue, 60 experiments were carried out in a 35×30×10 cm detachment tray using a rainfall simulator. By sieving a sandy loam soil, two sub-samples with different maximum aggregate sizes of 2 mm (D_{max}2mm) and 4.75 mm (D_{max}4.75mm) were prepared. The soils were exposed to two different rain intensities (57 and 80 mm h^{-1}) on several slopes (0.5, 2.5, 5, 10, and 20%) each at three replicates. The result showed that for all slope gradients and rain intensities, the most fraction percentages in soils D_{max}2mm and D_{max}4.75mm were in the finest size classes of 0.02 mm and 0.043 mm, respectively. The soil containing finer aggregates exhibited higher transportability of pre-detached material than the soil containing larger aggregates. Also, IR increased with increasing slope gradient, rain intensity and aggregate size under unsteady state conditions because of less development of surface

Fig. 1.