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On the Fixed Rainfall Intensity: Effects on Overland Flow Resistance, Shear Velocity and on Soil Erosion

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Abstract : Raindrops and overland flow both are erosive parameters but they do not act by the same way. The overland flow alone tends to shear the soil horizontally and concentrates into rills. In the presence of rain, the soil particles are removed from the soil surface in the form of a uniform sheet layer. In addition to this, raindrops falling on the flow roughen the water and soil surface depending on the flow depth, and retard the velocity, therefore influence shear velocity and Manning’s factor. To investigate this part, agricultural sandy soil, rainfall simulator and a laboratory soil tray of 0.2x1x3 m were the base of this work. Five overland flow depths of 0; 3.28; 4.28; 5.16; 5.60; 5.80 mm were generated under a rainfall intensity of 217.2 mm/h. Sediment concentration control is based on the proportionality of depth/microtopography. The soil loose is directly related to the presence of rain splash on thin sheet flow. The effect of shear velocity on sediment concentration is limited by the value of 5.28 cm/s. In addition to this, the rain splash reduces the soil roughness by breaking the soil crests. The rainfall intensity is the major factor influencing depth and soil erosion. In the presence of rainfall, the shear velocity of the flow is due to two simultaneous effects. The first, which is horizontal, comes from the flow and the second, vertical, is due to the raindrops.

Keywords : flow resistance, laboratory experiments, rainfall simulator, sediment concentration, shear velocity, soil erosion
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