



## **Hydraulic properties for interrill erosion on steep slopes using a portable rainfall simulator**

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The hydraulic parameters for sheet flow on steep slopes have been not frequently measured because the shallow flow depth and slow flow velocity are difficult to measure. In this study hydraulic values of sheet flow were analyzed to evaluate interrill erosion on steep slopes. A portable rainfall simulator was used to conduct interrill erosion test. The kinetic energy of rainfall simulator was obtained by disdrometer being capable of measuring the drop size distribution and velocity of falling raindrops. The sheet flow velocity was determined by the taken time for a dye transferring fixed points using video images. Surface runoff discharge and sediment yield increased with increase of rainfall intensity and kinetic energy and slope steepness. Especially sediment yield was strongly correlated with sheet flow velocity. The maximum velocity of sheet flow was 2.3cm/s under rainfall intensity of 126.8mm/h and slope steepness of 53.2%. The sheet flow was laminar and subcritical flow as the flow Reynolds number and Froude number are respectively the ranges of 10 ~ 22 and 0.05 ~ 0.25. The roughness coefficient (Manning's  $n$ ) for sheet flow on steep slopes was relatively large compared to them on the gentle slope.

**Keywords:** Sheet flow velocity; Rainfall simulator; Interrill erosion; Steep slope

This work was supported by the National Research Foundation of Korea(NRF) grant funded by the Korea government(MSIP) (No. 2015R1C1A2A01055469).