Public Abstract

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Title:Comparison of Rainfall Energy and Soil Erosion Parameters from a Rainfall Simulator and Natural Rain

Numerous studies have used artificial rainfall to quantify relationships for runoff and soil detachment. Application of these results to natural rainfall conditions is dependent in part on how well artificial rainfall mimics these natural conditions. In this study, an optical rainfall imaging system, was used to determine the drop-size distributions (DSDs) of natural rain in Missouri. These observations have been compared to those from an indoor gravity rainfall simulator.

This thesis reports the results of the DSD intercomparison, where a gamma distribution curve was expected, but a special form of a gamma distribution (exponential distribution) was found. This thesis also explores impact of the increased velocity of droplets due to wind that can account for up to one quarter of the total kinetic energy of the raindrops (Helming 2001). However, the results presented here show that about one-half of the total kinetic energy was estimated from horizontal wind, although highly dependent on wind velocity.