Geophysical Research Abstracts
Vol. 17, EGU2015-15621, 2015
EGU General Assembly 2015

Laboratory rainfall experiments on raindrop impacted flow erosion of different sand mixtures.

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Soil erosion is a globally occurring process that causes the loss of nutrient rich soil all over the world. Because of its global importance, many investigations in the last decades have sought to improve our understanding of the involved processes and to develop predictive tools or models to support farmers in reducing the threat of soil erosion. However, the mechanistic and physical understanding of the processes are still not well enough understood, so that predicting models often perform relative poorly outside of their test environment. One reason, why there is still a lack of knowledge, could be, that many investigations were performed under as natural as possible conditions, before the actual basics are properly understood. This resulted in highly complex systems with rather uncontrolled experimental conditions, so that the experimental data was a result of many different parameters.

The main aim of this study was to improve the mechanistic understanding of raindrop impacted flow erosion, by using a bottom-up approach. Under highly controlled experimental conditions, most of the influencing parameters like flow velocity and depth, raindrop size, spatial rainfall distribution, and fall velocity were kept as constant as possible. By changing only the size distribution of the sandy substrate, specific relations between drop kinetic energy, force of flow and transport rate could be collected. This contribution shows the experimental design and presents preliminary, but promising results that indicate that this bottom-up approach could lead to a better understanding of the erosion process in raindrop impacted flows.