



## **Investigation of detachment and transport processes of sediment using different sand mixtures in high precision rainfall simulations**

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Detachment and transport of sediment in the landscape are controlled by many different factors. Beside environmental factors such as soil surface properties, land management and vegetation cover, the dominant ones are rainfall and surface flow characteristics. In order to be able to investigate the change of sediment properties over transport distance and time, it is, therefore, necessary to understand the basic interactions between rainfall kinetic energy and amount, particle size and density as well as flow depth and velocity. So far, the mechanistic understanding of these principal physical interactions is mostly of empirical nature, obtained either under natural, highly complex and uncontrollable conditions, or with rainfall experiments that weren't able to control the conditions with high enough precision. The aim of this study was, therefore, to fill this gap of knowledge in our mechanical process understanding by conducting rainfall experiments on different sand mixtures. In this bottom-up approach, the highly controlled experimental conditions and the use of stable sand ensured that the number of variable factors was kept to a minimum. Thus, specific relations between sand-sizes, drop kinetic energy, force of flow, and resulting erosion rates could be obtained. Although the results are very promising and could lead to a better understanding of the erosion processes in the future, they clearly show that already straightforward sand mixtures behave in a very complex way. Further experiments with simple grain mixtures are, therefore, needed before experiments on more complex, instable sediments can or should be investigated.