



Investigating the effects of land management practices on upland erosion using a state-of-the-art laser scanner technique

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Rill erosion is a major form of soil and nutrient loss that affects the productivity of agricultural lands and threatens our environment. In this study, laboratory experiments are currently being conducted at a plot scale level to identify the effects that land management practices have on rill erosion processes and the fluxes of both water and sediment. Identification of the role that management practices has on erosion processes will lead to more sustainable agriculture practices, thus avoiding the loss of vital nutrients and reduction of the soil's water-holding ability. A state-of-the-art laser scanner technique is utilized, providing an accurate spatial resolution of 0.5 mm. Based on this technique, a laser beam is projected vertically onto the bed surface while an infra-red camera detects the light spot reflected from the surface. Knowledge of the bed topography allows us to determine the associated drainage networks, flow direction, and stream segmentation via GIS (Geographic Information System) modeling. Results from this study advance the knowledge at the plot scale level while paving the way for larger scales such as catchment and watershed. Data sets obtained from this study will be used as input files for numerical models such as the CAESAR landscape evolution and erosion model and the physically based, distributed parameter Water Erosion Prediction Project (WEPP) model to assess the effects of environmental system changes on hydrologic and erosion processes.