



How is initial soil erosion affected by rainfall intensity and kinetic energy?

Martin Neumann (1), Thomas Iserloh (2), Jesús Rodrigo Comino (2,3), Petr Kavka (1), Manuel Seeger (2), and Johannes B. Ries (2)

(1) Czech Technical University in Prague, Faculty of Civil Engineering, Department of irrigation, drainage and landscape engineering, Prague 6, Czech Republic (martin.neumann@fsv.cvut.cz), (2) Physical Geography, Trier University, 54286 Trier, Germany, (3) Department of Geography, Málaga University, Málaga, Spain

Rainfall simulation with small scale simulators is a method used worldwide to assess the generation of overland flow and initial soil erosion. For a thorough interpretation of the obtained experimental data, it is necessary to know detailed information of the rainfall characteristics. This study presents the effect of different rainfall intensities and kinetic energies on initial soil erosion rates under controlled experimental conditions. For this research the small portable rainfall simulator of Trier University was used. The experimental plot is 0.28 m^2 and the height of the nozzle is 2 m above ground. We applied a wide range of rainfall intensities (20, 40, 60 and 80 mm h^{-1}) and kinetic energies ($0.4 - 9 \text{ J m}^2 \text{ mm}^{-1}$). For this purpose, a set of various nozzles were tested under laboratory conditions. First, the spatial distribution of the artificial rainfall on the plot surface was measured to ensure the reproducibility of the experiments with constant rainfall intensity. Second, the drop size distribution was tested to control and adjust its similarity to the one measured in natural events.

With the selected nozzles and rainfall intensities, 54 rainfall simulations were performed on prepared surface at the experimental site of Trier University. With the measured values a 3D matrix of rainfall intensity, kinetic energy and soil loss were calculated. This method allows an accurate estimation of soil erodibility for a wide range of rainfall characteristics. The presentation was funded by Ministry of agriculture of the Czech Republic (research project QJ1520265).