



Variable rainfall intensity during soil erosion experiments at the laboratory rainfall simulator

Tomas Laburda, Pavla Schwarzova, and Josef Krasa

Czech Technical University in Prague, Faculty of Civil Engineering, Department of irrigation, drainage and landscape engineering, Prague, Czech Republic (tomas.laburda@fsv.cvut.cz)

Experimental research of soil erosion at the laboratory rainfall simulator at the CTU in Prague continued with 11th soil set Trebesice III in 2014/2015. Standard simulations with constant rainfall intensity were complemented by additional simulations with variable rainfall intensity with two different patterns. The main objective was to determine the feasibility of these experiments and the effect on erosion characteristics compared to those with constant rainfall intensity.

This measurement consist of 60 minute simulations (change in intensity in 20. and 40. minute of simulation) with increasing rainfall intensity with pattern of 20-40-60 mm/hr (“inc”) and decreasing intensity with pattern of 60-40-20 mm/hr (“dec”) which have been compared with experiments with constant rainfall intensity of 40 mm/hr (“c40”). All experiments thus reaching the same total precipitation during entire simulation. This comparison was done on soil sample with dimensions of 4x0,9x0,15 meters and slope adjusted at 4° and 8°. Final evaluation consists of comparison of development and cumulative values of surface runoff and soil loss.

In case of steady soil conditions (in this case, the experiments on the slope 4°) results show there is no significant difference in surface runoff in term of cumulative values and development (in the middle period of simulations with rainfall intensity of 40 mm/hr, i.e. 20-40. minute of every experiment) between “c40”, “inc” and “dec”. On the other hand, results of soil loss from the same experiments differ according to rainfall intensity pattern in both development and cumulative values. While “inc” experiment has slightly lower (up to 10 %) soil loss than “c40”, development of soil loss (in the middle period of simulations with 40 mm/hr) of “dec” experiment is almost two times lower compare to “c40”. Experiments with longitudinal soil surface of 8° differ in soil moisture that affects results more than variable rainfall intensity pattern.

Experimental research of soil erosion at the laboratory rainfall simulator confirmed that it is possible to easily simulate and observe soil erosion characteristic with variable rainfall intensity. Results show basic differences in rainfall-runoff parameters between experiments with two variable rainfall intensity patterns and experiments with constant rainfall intensity.

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