



## **Experimental research of soil erosion using laboratory rainfall simulator**

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Soil erosion has been an important part of research at the Department of Irrigation, Drainage and Landscape Engineering, Czech Technical University in Prague since the 50s of the 20th century. Bigger emphasis was put later on practical methods resulting in acquisition of laboratory rainfall simulator in 1999.

This article compares data from simulations done at the laboratory rainfall simulator which is used for experimental measurement of rainfall-runoff processes on soil samples (typical soil type groups) from agriculture land in the Czech Republic. Total 10 soil sets have been tested within 255 simulations (247 rainfall-runoff hours in total) from 2002 to 2014. These soil sets cover wide range of soil types from silty clay loam to sandy loam soils or from impervious to pervious soils.

Setting values of rainfall intensity (40 to 60 mm/hr), inclination (longitudinal slope from 4° to 8°) and initial condition of surface runoff (crusted or loosened) present primary parameters of every experiment. On the basis of different combinations of setting, 2 representative evaluation states of the minimum (min LC) and maximum (max LC) load conditions were established.

The most important data obtained at the Simulator are soil moisture content, progression of surface runoff, soil loss and infiltration. Results clearly show dependence of initial moisture content on physical properties, when impervious soils with high fraction of clay reach over 30 % wt., pervious soils with high fraction of sand achieve initial average moisture content only about 20 % wt. Results of steady-state values of surface runoff and soil loss for minimum and maximum load conditions and its ratio show that highest increase of values due to higher load conditions reach silt loamy soil (Horomerice), silt clay loamy soil (Klapy) and loamy soil (Vsetaty), while the lowest increase reach silt loamy soil (Trebsin I) and sandy loamy soil (Trebesice I). General trend in all cases is obviously to increase both values, but while the average values of surface runoff increased 2.1-times, in the case of soil loss steady state values increased even 5.6-times.

During these 12 years of experimental research, large sets of data were collected and used for comparison of behaviour of different soils under extreme conditions and also as input parameters for recalibration of SMODERP (Simulation Model for Determination of Surface Runoff and Erosion Processes) which has been developed at the same department since 1989.

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