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The influence of different roll erosion control products to the particle size distribution of the soil sediment eroded on artificial slopes

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In this contribution the particle size distributions of the soil sediment obtained from soil erosion experiments were analysed. All the tests were done on arable topsoil's, separately the size distribution of the soil aggregates and individual soil particles were evaluated. Soil erosion was initiated under the controlled conditions. CTU Prague laboratory rainfall simulator and field laboratory in Jirkov were used for this research. The rainfall was artificially generated with use of a nozzle type rainfall simulator. The sediment transported due to the surface runoff and rill erosion was collected from the discharge of the inclined soil erosion plots (slopes 20 – 34°, slope length 4 m).

During each experiment, eight samples were collected. Four samples were collected during the first experimental rainfall. For the next ten days, the container was kept aside the rainfall. Afterwards, the raining with the rainfall simulator on plot (which now had different initial condition compared to the plot during the first experimental rainfall as the plot already contained erosion rills from the previous episode) has been resumed and another four samples were collected.

Experimental plots were vertically divided into two parts. On one part was an eel and on the second part were different types of rolled erosion control products (RECPs) – Enkamat 7010, and 7020, Biomac-C, coir fibres K700 and K400, jute, Macmat 8.1, mulch, hay, nonwoven, fortrac 3D and triangle. The influence of RECPs to the particle size distribution was investigated.

Laser diffraction has been selected as a method to determine particle size distribution and device Mastersizer 3000 was used. By the comparison of the particle size distribution, of more than five hundred samples, the different response to the soil erosion mechanism and the influence of external factors (slope of the experimental plot, initial condition and presence of RECPs) on the particle size distribution and soil aggregates content in eroded sediment were investigated. It has been found that both the particle size and aggregates size distribution of the eroded sediment changes considerably in time.

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