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Factors affecting splash erosion in mountain area (Polish Carpathian)

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Splash erosion is one of the most important factors affecting the denudation system of river basins. The result of splash is the destruction of the structure and reducing of the permeability of soil, which is the cause of occurrence of slopewash. A number of relationships describing the splash mechanism was found in laboratory conditions. The necessity to carry out field measurements is postulated in the world literature and reflects the need to verify results of laboratory tests and theoretical studies.
The splash research was conducted in natural conditions on experimental plots with black fallow (plots: A, B, C, D) and meadow (plot E) with different gradient (11°, 0°) and usage time in the External Western Carpathians (Poland). The study was carried out in the period 2012-2016 (from May to October). The differentiation and splash size was measured using cups method with varying diameter of funnels (75, 110 and 170 mm). Precipitation data were obtained from the Research Station in Szymbark. The analysis has shown statistically significant differences between the results obtained both on individual experimental plots and in the funnels with varying diameter. The black fallow splash was even 95 times higher than in the meadow and up to 20 times higher than in a floodplain. The rain erosivity threshold value causing splash on the Carpathian foothill slope was 7 MJ ha-1 mm-1. On average, a splash accounts for 65% of the slopewash. The soil particles are detached to a maximum height of 40 cm – down the slope, and 30 cm – up the slope. The measurements on experimental plots showed that with time, there decreases the difference between soil splash in plots of different usage times and the same gradient. In the first year the differences was 63% and after two and three years 15% and 3%, respectively. This research contributes to knowledge about the dynamics of the splash and the results could be valuable for the development of rainfall erosion models.