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A new method for describing soil detachment by a single waterdrop impact

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Soil is one of the elements that determine the water cycle due to its retention ability; it is also a landscape-shaping element and the basis of agricultural production. It is a limited and non-renewable element of the geographical environment at a certain stage of Earth's history, and should therefore be protected.
One of the physical processes of soil degradation is water erosion. In the first phase, there is detachment of particles eroded from the surface, i.e. splash. Depending on the energy and intensity of precipitation and the terrain features, this can lead to runoff, in the next stage, and in extreme cases to rainwash of soil.
Methods used previously in studies of splash were mainly based on weight measurements of collected soil material that had splashed. This requires treatment of the total material collected, as the mass of soil displaced by the impact a single drop is so small that it is not measurable even when using a very accurate weight.
In the proposed method of measurements, the splashed soil material was collected on filter paper, allowing determination of the distance over which the displacement of the particles occurred followed by an analysis of the soil material displaced at a given distance under the microscope. As a result of the measurements, the relationships between the following parameters were determined:
- the distances of splash,
- the surface areas of splash tracks into relation to distance,
- the surface area of the solid phase transported over a given distance,
- the ratio of the solid phase to the splash track area in relation to distance.
Differences were observed between the results obtained for both the soils of different granulometric composition as well as for the same soil with varying humidity.
The use of optical methods in the analysis of microscopic images gave new opportunities to describe the initial phase of water erosion - splash. It facilitates analysis of splash (in the laboratory) caused by a single drop of simulated precipitation.