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Aggregate size distribution of the soil loss

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In agricultural areas the soil erosion and soil loss estimation is vital information in long-term planning. During the initial period of the erosion a part of the soil particles and aggregates get transportable and nutrients and organic matter could be transported due to the effect of water or wind. This preliminary phase was studied with laboratory-scale rainfall simulator. Developed surface crust and aggregate size composition of the runoff was examined in six different slope-roughness-moisture content combination of a Cambisol and a Regosol. The ratio of micro- and macro aggregates in the runoff indicate the stability of the aggregates and determine the transport capacity of the runoff. Both soil samples were taken from field where the water erosion is a potential hazard. During the experiment the whole amount of runoff and sediment was collected through sieve series to a bucket to separate the micro- and macro aggregates. In case of both samples the micro aggregates dominate in the runoff and the runoff rates are similar. Although the runoff of the Regosol – with dominant >1000μm macro aggregate content – contained almost nothing but <50μm sized micro aggregates. Meanwhile the runoff of the Cambisol – with more balanced micro and macro aggregate content – contained dominantly 50-250μm sized micro aggregates and in some case remarkable ratio 250-1000μm sized macro aggregates. This difference occurred because the samples are resistant against drop erosion differently. In case of both sample the selectivity of the erosion and substance matrix redistribution manifested in mineral crusts in the surface where the quartz deposited in place while the lighter organic matter transported with the sediment. The detachment of the aggregates and the redistribution of the particles highly effect on the aggregate composition of the runoff which is connected with the quality of the soil loss. So while the estimation of soil loss quantity is more or less is easy, measuring aggregate size distribution which is led to nutrient and organic matter redistribution is one of a key questions to improve erosion estimation.

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