



Experimental wind-driven rain erosion study on agricultural soils

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Wind is potentially capable to considerably increase soil erosion by rain drops. In contrast to laboratory experiments, in-situ experiments enable the measurement of soil erosion by wind and rain including the reactions of relatively intact soil surfaces and a complete body of soil.

The Portable Wind and Rainfall Simulator of Trier University was applied on winter cereal fields to measure rain erosion on agricultural areas with and without the influence of wind. The test areas are situated near Pamplona, Navarre and recognized to be representative for large parts of northern Spain concerning soil, land use and climate. The soil surfaces on the fields were ploughed and sparsely covered by recently sowed winter cereals. The soil water content was close to saturation due to long lasting rainfall.

Runoff was medium to high with runoff-coefficients ranging from 26 to 100%.

The eroded material from rainfall simulations ranged from 14.5 to 42.5 g m² / 30min.

The eroded material from wind-driven rain ranged from 28.1 to 47.3 g m² / 30 min.

Compared to windless rainfall, the wind-driven rain increased erosion of soil material up to 82.2%. In one case, the eroded material decreased by 18.3%.

The results indicate a strong influence of wind on rain erosion on recently seeded agricultural soils. Wind influence can be an important aspect for the general assessment of sheet erosion and supports the finding that a neglect of this factor might lead to severe underestimation of soil loss.