



Experimental measurement of wind and water erosion in Aragón and Andalusia, Spain

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For more than 50 years rainfall simulators and wind tunnels are important tools for soil erosion studies in the field. Laboratory investigations in wind tunnels with the ability of simultaneous rainfall production showed that wind significantly alters drop sizes, drop fall velocities and impact angles of falling raindrops. Leading to higher kinetic energies and increased soil detachment in comparison to falling drops with no wind influence. In most simulators this combined effect of wind and water is either not taken into account or deliberately excluded from the system, because of increasing complexity of processes involved.

Within the project Ri 835/3-1, founded by the Deutsche Forschungsgemeinschaft, a portable combined wind and rainfall simulator for in-situ soil erosion studies was developed and used in Spain (Aragón, Andalusia), Morocco (Souss valley), and Germany (Eifel). The main objective of these field experiments was to quantify the susceptibility of different soil surface conditions and soil surface treatments to soil erosion by wind, water, and the combined effect of wind and water.

Here, an overview of the results of the experimental measurements in Spain is given. The results show that wind erosion in Aragón is more or less negligible on undisturbed, crusted soil surfaces, but it can reach high amounts of up to 50 g m^{-2} on rolled and grazed fields. Measurements in Andalusia show mean erosion rates of 24 g m^{-2} on crusted soil surfaces. The expected increase of soil detachment, due to the combined force of wind and water in comparison to solely rainfall simulations, is apparent in most of the simulated runs.

In total, the results proof that this combined wind and rainfall simulator is a valuable tool for soil erosion studies in the field and that it can be used to investigate various research questions.