



Concept and calibration of a portable wind and rain simulator

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Wind and water are the main driving factors causing soil degradation. At a glance both processes would seem to exclude each other. Therefore researchers have been studying both processes separately for many years. Recent research, especially in laboratory wind tunnels, has proven the existence of very complex interactions between wind and water erosion. A lack of knowledge was stated, so that in future more combined studies are necessary to create a better understanding of these linkages.

Main objective of this study is to investigate experimentally both processes on a plot scale in the field. As a first step a small portable wind tunnel was constructed and calibrated. With a pitot tube anemometer wind pressure inside the tunnel was measured at three cross sections (50 cm, 150 cm, 250 cm of tunnel length). The measurement grid size was 10 by 10 cm, so that in total 49 values per cross section were recorded. These measurements together with smoke gas tests indicate that turbulences from the fan have been reduced significantly by the air straighter, although a completely laminar flow hasn't been reached.

As next step a rain simulator has been incorporated into the described portable wind tunnel to generate the ability of simultaneous test runs. Calibration results (e.g. rain drop distribution, rain drop angle and velocity) of this combined wind and rain simulator show, despite the obvious physical limitations (e.g. fetch length, aerodynamic wind field), its advantages for comparative soil erosion research.