Geophysical Research Abstracts
Vol. 17, EGU2015-6075-1, 2015
EGU General Assembly 2015


# Particle transport patterns of short-distance soil erosion by wind-driven rain, rain and wind

Miriam Marzen (1), Thomas Iserloh (1), João L.M.P. de Lima (2), and Johannes B. Ries (1)

(1) Trier University, Physical Geography, Trier, Germany (mmarzen@uni-trier.de), (2) University of Coimbra, Institute of Marine Research (IMAR) and Marine and Environmental Sciences Centre (MARE), Department of Civil Engineering, Faculty of Science and Technology (FCTUC), Coimbra, Portugal

Short distance erosion of soil surface material is one of the big question marks in soil erosion studies. The exact measurement of short-distance transported soil particles, prior to the occurrence of overland flow, is a challenge to soil erosion science due to the particular requirements of the experimental setup and test procedure. To approach a quantification of amount and distance of each type of transport, we applied an especially developed multiple-gutter system installed inside the Trier Portable Wind and Rainfall Simulator (PWRS).
We measured the amount and travel distance of soil particles detached and transported by raindrops (splash), wind-driven rain (splash-saltation and splash-drift) and wind (saltation). The test setup included three different erosion agents (rain/ wind-driven rain/ wind), two substrates (sandy/ loamy), three surface structures (grain roughness/ rills lengthwise/ rills transversal) and three slope angles (0°/+7°/-7°).
The results present detailed transport patterns of the three erosion agents under the varying soil and surface conditions up to a distance of 1.6 m. Under the applied rain intensity and wind velocity, wind-driven rain splash generates the highest erosion. The erodibility and travel distance of the two substrates depend on the erosion agent. The total erosion is slightly higher for the slope angle -7° (downslope), but for wind-driven rain splash, the inclination is not a relevant factor. The effect of surface structures (rills) changes with traveling distance. The wind driven rain splash generates a much higher amount of erosion and a further travel distance of the particles due to the combined action of wind and rain. The wind-driven rain factor appears to be much more significant than the other factors.
The study highlights the effects of different erosion agents and surface parameters on short-distance particle transport and the powerful impact of wind-driven rain on soil erosion.