Geophysical Research Abstracts
Vol. 13, EGU2011-1793, 2011
EGU General Assembly 2011

Raindrop impacted shallow overland flow transport under different fall trajectories of wind-driven rain (WDR)

Hilal Samray, Gunay Erpul, and Donald Gabriels
Dept. of Soil Management and UNESCO Chair on Eremology, Ghent University, Belgium

The impact of raindrops on soil is not only a first agent initiating detachment by the rainsplash but also a significant cause of transporting the detached particles after shallow overland flow occurs on the soil surface. The drop impact effect is explained as a combination of size, velocity and frequency of impacting raindrops. However, for the rains falling through a vector field introduced by near-surface wind flow, such splash sub-processes as detachment, entrainment and transport of soil particles become much more complicated than as they are under wind-free rainfalls.
This paper examines the effect of falling raindrops with given vector fields on soil surfaces without vegetative cover for sediment transported by raindrop-impacted flow. In this study, by changing the wind speeds (6, 10, 12 ms-1) and direction (windward and leeward blowing winds) together with different slope degrees of soil surfaces (4, 8.5, and 11.3°), experiments to work with different fall trajectories of wind-driven rain (WDR) were set-up in the wind and rain simulation facility of the International Center for Eremology (ICE), Ghent University, Belgium. The results were statistically tested using both raindrop impact and overland flow parameters as required by this process mechanics. Respectively, flux of rain energy vectorally computed by the fall trajectories of WDR and the stream power of shallow overland flow adequately described the sediment transport rates. The contributions of the study were to use vectorally calculable parameters for both raindrop and shallow flow and to model the process under WDR.

Key words: interrill erosion, rainfall vector field, kinetic energy flux, stream power