Geophysical Research Abstracts
Vol. 20, EGU2018-1845-2, 2018
EGU General Assembly 2018

Splash erosion of three soils under natural rainfall conditions in Central Europe and New Zealand

Nives Balenovic (1), Lisbeth Lolk Johannsen (1), Peter Strauss (2), Tomas Dostal (3), Jan Devaty (3), Tomas Laburda (3), Josef Krasa (3), David Zumr (3), Thomas Cochrane (4), Mike Arnaiz (4), and Andreas Klik (1)

(1) Universität für Bodenkultur Wien, Department of Water, Atmosphere & Environment, Vienna, Austria (nives.balenovic@boku.ac.at), (2) Federal Agency for Water Management, Institute for Land and Water Management Reserach, Petzenkirchen, (3) Czech Technical University, Faculty of Civil Engineering, Prague, Czech Republic, (4) University of Canterbury, Department of Civil and Natural Resources Engineering, Christchurch, New Zealand

Soil detachment caused by raindrops hitting the soil surface is the initiating mechanism of soil erosion by water. The amount of splash is highly dependent on rainfall characteristics (mostly kinetic energy and intensity) and soil properties. The objective of this study was to determine the impact of rainfall kinetic energy on splash detachment for different soils.
Field experiments took place from June 2017 at two sites (Mistelbach and Petzenkirchen) in eastern Austria, one site (Prague) in the Czech Republic, and a site in New Zealand with long-term annual average precipitation of 537, 902, 587 and 648 mm, respectively. Each site was equipped with a standard automated rain gauge and a laser optical disdrometer to measure drop size distribution and fall velocity of rainfall. Soils with textures ranging from silt loam to loamy sand were investigated using modified Morgan splash cups (10 cm diameter). Soils were sampled in spring 2017 at seedbed condition, air-dried and sieved through a 1 cm sieve. Each soil was placed in splash cups (with 3 or 4 replicates per soil type) and left in the field under natural rainfall. Splash cups were mainly replaced after precipitation amounts higher than 5 mm. Amount of detached soil as well as soil surface characteristics before and after exposure were measured and analysed.
During the investigation period around 40 rainfall events were analysed for the Austrian locations. The results show that loamy sand delivered approx. 60% higher splash rates compared to silt loam soils. Splash detachment could be described by linear or power functions of rainfall kinetic energy with R2 between 0.37 and 0.51 affected by high variability of data. A comparison of splash results for identical soils at different sites revealed the necessity for further methodological harmonisation of sample preparation.