Geophysical Research Abstracts, Vol. 9, 06524, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-06524

Small-Scale Erosion Dynamics in Different Vegetation Communities in Jornada, New Mexico

D. Lister (1), K. Michaelides (1), J. Wadham (1), J. Wainwright (2) and A. Parsons (2)

(1) School of Geographical Sciences, University of Bristol, United Kingdom, (2) Department of Geography, University of Sheffield, United Kingdom (debbie.lister@bristol.ac.uk)

We present erosion data from a series of small-scale rainfall-simulation experiments undertaken in the dryland environment of Jornada, New Mexico. Quantifying erosion dynamics in a degrading landscape enables us to investigate the influence of different surface properties on the small-scale movement of sediment. Rainfall simulations were undertaken on 1.5 m^2 plots on three vegetation types: mesquite, creosotebush, and grassland. Mesquite and creosotebush represent degraded land, whereas the grassland represents land prior to degradation onset. Prior to each simulation, a suite of surface properties was measured to investigate the reasons behind the erosion patterns produced. Tree-regression analysis was undertaken on the fluxes of runoff and sediment collected according to the various surface properties. The erosion fluxes were found to be greater from the mesquite, due to a combination of the locally steep slopes, yet low surface aggregate stability. On the shallow slopes of the creosotebush and grassland, high runoff combined with low crust cover also produced relatively high erosion yields. Such findings have significant implications on the land degradation process in Jornada. The greater sediment flux produced from the mesquite generated higher sediment-bound nutrient fluxes than the creosotebush. However, preferential erosion of finer material was also a driving factor behind the different sediment-bound nutrient dynamics according to vegetation type, leading to comparable or higher losses of sediment-bound nutrients from the grassland than from the mesquite. Overall, the grassland in Jornada was less able to conserve nutrients in both dissolved and sediment-bound forms than the mesquite and creosotebush. The location of the remaining pockets of grassland (i.e. whether they are source or sink areas) will determine their susceptibility to further land degradation within Jornada.