Geophysical Research Abstracts, Vol. 8, 03200, 2006
SRef-ID: 1607-7962/gra/EGU06-A-03200

Experiments on the effect of moving rainstorms on surface processes for small scales (Laboratory soil flumes)

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Most water erosion studies do not take into account the movement of storms across drainage areas, due to the combined effect of wind and rain. However, the importance of storm movement on surficial flows has long been recognised, at scales ranging from headwater scales to larger catchment basins. On the other hand, the soil loss resulting from rainstorms moving in different directions across drainage areas is clearly linked with the characteristics of the corresponding overland flow hydrographs. All these processes (rainfall, wind, runoff, soil erosion) involved can be studied at different scales. Laboratory experiments can be used to explore, in controlled environment, the dynamics of these complex processes, but only at small scales.

The main objective of this study was to investigate, in laboratory conditions, the influence of the storm movement on overland flow and soil loss from sloping areas. Use was made of a rainfall simulator, several soil flumes with different shapes (e.g., square, rectangular, circular, convergent and divergent) and a wind generator. Overland flow and sediment deliveries were measured at the outlet of the flumes.

The results of the laboratories show that storm direction, affecting the spatial and

temporal distribution of rainfall, has a marked influence on the runoff and soil loss processes.

Keywords: Storm movement; Interrill erosion; Small scales; Laboratory experiments.