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Granulometric characterization of sediments transported by runoff generated by moving storms

J.L.M.P. de Lima (1, 2), C.S. Souza (2), V.P. Singh (3), J.M.M. Azevedo (4) and M.I.P. de Lima (2, 5)

(1) Depart. of Civil Eng., Univ. of Coimbra, Portugal (plima@dec.uc.pt), (2) Institute of Marine Research, Portugal, (3) Depart. of Biological and Agricultural Eng., Texas A and M Univ., U.S.A., (4) Depart. of Earth Sciences, Univ. of Coimbra, (5) Depart. of Forestry, Polytechnical Institute of Coimbra

The importance of storm movement, due to the combined effect of wind and rain, on surficial flows has long been recognised, at scales ranging from headwater scales to larger catchment basins. On the other hand soil loss from rainstorms moving in different directions across drainage areas are clearly the result of the corresponding overland flow dynamics. All these processes (rainfall, wind, runoff, soil erosion) involved are germane for investigation at different scales. In this study, these were investigated in a laboratory.

The soil flume used in the experiments was 3 m long and 0.30 m wide. To simulate moving rainstorms, a rainfall simulator was moved along different directions over the soil surface of the flume. The main objective of the study was to characterize, in laboratory conditions, the size distribution of the sediments transported by overland flow, and its evolution, in time for rain events. The size distribution of the eroded material is governed by the capacity of the flowing water to transport it. Granulometric curves obtained through conventional hand sieving and optical spectrophotometer method (material below 0.250 mm) were constructed from overland flow and sediment deliveries collected at the outlet of the flume. Surface slope was set as 2, 7 and 14%. Rainstorms were moved with a constant speed, upslope and downslope, along the flume or were kept static.

The results of the present study show that storm movement, affecting spatial and temporal distributions of rainfall, has a marked influence on the granulometric character-

istics of sediments transported by overland flow. Storms moving downslope are the most potentially hazardous in terms of erosion.