



## **Sediment response to moving rainstorms: laboratory experiments**

J.L.M.P. de Lima

Institute of Marine Research and Department of Civil Engineering, Faculty of Science and Technology – Campus 2,  
University of Coimbra, 3030-788 Coimbra, Portugal. e-mail: plima@dec.uc.pt

The soil material transported by surface runoff is an important factor, for example, in water quality management, environmental decision making, urban management and ecosystems sustainability. This study aims at contributing to increased understanding of water erosion factors and processes. The main objective is to quantify experimentally the soil loss caused by both non-moving and moving rainstorms.

The importance of storm movement, due to the combined effect of wind and rain, on surface flows has long been recognised, at scales ranging from headwater scales to larger catchment basins. All these processes (rainfall, wind, runoff, soil erosion) involved are germane for investigation at different scales.

In this study, laboratory experiments were carried out using several soil flumes and a movable sprinkling-type rainfall simulator. To simulate moving rainstorms, the rainfall simulator was moved upstream and downstream over the soil surface at different speeds.

During runoff events overland flow and sediment transport were measured in order to determine hydrographs and sediment production over time. 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.

Distinct hydrologic responses for storms moving upstream and downstream were identified. Soil loss by sheet erosion caused by downstream moving rainstorms was higher than that caused by identical upstream moving rainfall storms or non-moving storms. The results also show that storm movement, affecting spatial and temporal distributions of rainfall, has a marked influence on the granulometric characteristics of sediments transported by overland flow during the runoff event. Storms moving downslope are the most potentially hazardous in terms of erosion.