



Rain simulator as a standardized laboratory measurement of soil structural stability

Luz Iglesias (1), Javier Cancelo González (1), Elena Benito (2), Manuel Álvarez (1), María Teresa Barral (1), and Francisco Díaz-Fierros (1)

(1) University of Santiago de Compostela, Faculty of Pharmacy, Department of Edaphology and Agricultural Chemistry, Santiago de Compostela, Spain (javier.cancelo@usc.es), (2) University of Vigo, Faculty of Biology, Department of Plant Biology and Soil Science, Vigo, Spain

Rainfall simulations are used since the 30's by scientist and technicians to study the soil erosion and soil hydrology. The basis of the rainfall simulation is that can reproduce the natural soil degradation processes, more accurately than the traditional methods used for the determination of structural stability. A rainfall simulator was built in 2006 based on those made by Guitián and Méndez (1961), and Morin (1967), to obtain standardized laboratory measurements of soil structural stability and a final implementation were made in the rainfall simulator to incorporate a intermittent fan-like water yet system with four sieves of 250 micrometres where the soil samples can be placed, and allow the simultaneous measurement of soil losses in the samples. Data obtained in the rainfall simulator, using different soils of the study basins, are related with the Ig Henin index and the results of the Emerson structural stability test.

At the same time with the laboratory test, 10 water sampling surveys were carried out during the hydrological years 2004/05 and 2005/06, in two basins located in the humid region of NW Spain belonging to the Anllons River basin, one of the main basins of Galicia-Costa, that has been subject of detailed hydrological studies since 2000 (Rial, M., 2007 and Devesa, R., 2009) and had continuous records of streamflow. The selected subbasins have 57,62 and 50,05 square kilometres respectively, and presents significative geological differences; being one of them formed, mainly, by schists and a lower area with granites and, the other one formed mainly by gabbros. The suspended sediments in the samples were separated by centrifugation and weighted in the laboratory to study the possible relationship between soil losses in the rainfall simulations and the sediment fluxes in the river. The analysis revealed a good relationship between the sediments delivery to the streams and soil losses measured in the rainfall simulations.