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Improvements in nozzle rainfall simulators used in laboratory environment

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Rainfall simulators are an important tool in studying soil erosion, which is considered a key process contributing to land degradation. The versatility of rainfall simulators enables their use in the laboratory and in the field, providing controlled conditions of rainfall intensity, kinetic energy, drop characteristics and event duration. Pressurized rainfall simulators have spray nozzles that can be characterized by the nozzle discharge, spray angle and pattern, and drop size distribution. However, the drop′s properties and hence the entire simulated event depend on the system operating pressure and respective flow rate and also the nozzle design.

The objective of this presentation is to report on recent improvements on rainfall simulators used in laboratory environment at the University of Coimbra, namely the use of pressure control devices upstream of nozzles, incorporation of meshes underneath sprays to change the spatial distribution of the kinetic energy and intensity of the simulated rain and fans to induce wind–driven rain. These improvements aimed at changing the simulated rain characteristics (e.g. intensity, kinetic energy and drop size distribution) and improve the quality and reproducibility of the rainfall simulations (e.g. precise start and stop, invariance in time).