



Runoff generation and soil erosion processes at multiple spatial scales in a Mediterranean mountain catchment

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Soil erosion is a critical driver for desertification in Mediterranean regions, a problem which could be accelerated due to changes in rainfall intensity and vegetation cover caused by climate change. The study of these impacts can be done through the use of ecohydrological and erosion models, but there is presently a lack of data on erosion rates and processes which limits the applicability of models to these regions. Project ERLAND seeks to address these issues through the intensive monitoring of representative Portuguese agroforestry watersheds.

This presentation will show preliminary results from a multi-scale monitoring network implemented in the Macieira de Alcoba agricultural watershed (north-central Portugal). The 95 ha watershed is located in the Caramulo mountain range, has a wet Mediterranean climate, and is covered mostly by commercial forests (c. 60%) and agricultural fields (c. 40%) characterized by a complex landcover pattern and the presence of terraces. The watershed is monitored since the last trimester of 2010. Runoff and sediment discharge data are recorded in a representative field and at the catchment scale.

At field scale, runoff from open plots is collected in tanks and measured with tipping bucket devices. The filtration of water samples allows an estimation of the sediment discharge at plot scale. Furthermore, soil moisture is recorded each 15 min at two depths in 4 sites along the field and the evolution of the vegetation cover and erosion features in the field is observed. At catchment scale, meteorological data are recorded at 15 min time step and water level and turbidity at 2 min time step at the outlet of the catchment. Other data collection includes the recording of sediment accumulation and the taking of water samples in four sites in the catchment river network, and a survey of erosion features and soil properties is done at regular time intervals to know the evolution of the catchment characteristics. The data collection strategy is aimed at parametrizing and calibrating an erosion model which can be applied to the study area.

This presentation will focus on the first results at the field and catchment scales during the main rainfall events of the autumn and winter of 2010/2011.