



## **Runoff generation, erosion and soil redistribution in a catchment with abandoned agriculture in the Central Spanish Pyrenees**

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Intensive agriculture is considered to be one of the most severe threats to soils, affecting their structural and nutrient dynamics and leading to a profound degradation of their functions. But it has been demonstrated also that extensification, far away from leading to a reduction of degradation processes, may cause an acceleration of them, especially by enhancing runoff and sediment production. This leads to a dramatical soil redistribution, first during period of agricultural use, and afterwards after its abandonment forming a spatial pattern of soils with different behaviour towards runoff generation and erosion.

The Spanish Central Pyrenees have suffered a radical extensification of land use from the beginning of the 20<sup>th</sup> century. Former investigations demonstrated in these catchments high geomorphodynamic activity as well as fast runoff processes. This makes the catchments there to be valuable laboratories for investigation of past and actual runoff and sediment production as well as the understanding of their evolution under the influence of different land uses.

Aim of the present study is to identify actual process diversity within a catchment formerly under agricultural land use. This comprises magnitude and spatial distribution of runoff generation and sediment detachment as well as an identification of possible pathways.

For this, a set of experimental methods such as rainfall simulations and rill erosion experiments are combined with mapping of soils, vegetation patterns and linear structure elements.

The results show that most of the soils within the catchment are prone to produce fast runoff, but only low sediment concentrations. This is caused mainly by the stabilizing residual stone cover on top of the soils, though there is only a weak vegetation cover protecting soils surface. Nevertheless, there can be identified areas with opposite behaviour on erosion and runoff: wetlands retain precipitation and runoff water due to the high infiltration and water retention capacity of their soils, and anthropogenic linear structures like unpaved roads, which produce themselves the highest amounts of runoff and sediments and concentrate flow, thus contribute to a fast transport of water and sediments towards the creek.

As a conclusion it can be demonstrated that soils on former agricultural land are degraded and for this very limited within their (pedohydraulic) functions. However, the currently missing management of land use and infrastructure may contribute decisively to soil redistribution.