



Soil loss and hydrological response of soils with gypsum, central Ebro Basin, NE Spain.

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This study has been undertaken in four experimental plots located in the central Ebro Basin, northeast Spain. Plots, fitted with collector devices and weather station, are located over smooth hillslope developed over gypsum and marl Miocene deposits. Soils are poor and scarce evolved, quite unstable, with a high porosity and infiltration rates and high solubility ratios. Climate is semiarid with 350 mm annual rainfall amount and 15°C of mean annual temperature.

The analysis carried out comprises precipitation, runoff and sediment yield data. The hydrological response of these areas is function of soil properties and rainfall characteristics. It shows that there are two hydrological responses types, which are related with the distribution of rainfalls along the year. First one is hortonian like, which takes place during wet periods and it is responsible of the main part of total sediment yield. Second one, is saturation excess overland flow like, it appears after long period the presence of either is controlled by a double threshold, starting from runoff higher than 5 l/m².

Sediment yield is mainly controlled by rainfall characteristics, vegetation, high erodibility and the hydrological response of soils. Two different thresholds have been identified, one on 20 mm rainfall and other above 60 mm/h maximum intensity. In rainfalls below this threshold infiltration is maximum and solutational exportation is the major erosional process. In contrast, when these thresholds are crossed suspended sediment export is dominant. Erosion rates are low due to the high soil permeability and the climatic variables of the area, being always higher in southern facing slopes. Due to the high soluble material of these soils, gypsum, also a study of exportation has been carried out. In this way the data used were the event record from the experimental

plots and rainfall simulation experiments. Chemical analysis and residuum were used as indicators from solutional erosion. Main results show the existence of a direct relationship between runoff volume and solutes. On the other hand, also there is a clear evidence of the control over solute transport by suspended sediments and runoff coefficient. All seems to indicate that solutional erosion is the main erosion type in these areas.