



1 Characteristic of eroded sediment and textural changes from an agricultural soil

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Accelerated erosion in agricultural land determines a redistribution of soil particles in the area interested by the process, contributing to the variability of physical, chemical and biological soil properties and, in some cases, producing significant environmental problems.

The aim of this research was threefold: (i) to analyse the quality of collected sediments, (ii) to determine the effect of the crop residues on eroded sediments and (iii) to verify change in textural composition of the original soil due to particles detachment.

Sediment samples were collected from a corncultivated sloping plot of 350 m². Two soil textural analyses were performed for the superficial layer (0-20 cm), the first one in 1991 and the second one in 2005, using the pipette method. Eight sediment samples were used, corresponding to the major runoff events in the fall 2004, and their particle-size distributions (PDS) were measured using a Laser Diffraction device.

The results show that, in soils with the silt fraction ranging between 40% and 50%, the PSD can be described by a gaussian function with the mean within the silt fraction, whose values were between 2 and 15 μm .

The selectivity of the erosion process can be explained considering that particles with a size higher than 200 μm have a physical mass that limit their movement, while for

particles with diameter below $2\ \mu\text{m}$, cohesive forces impede particle detachment.

The mean diameter and its standard deviation are influenced by the presence of soil coverage, plants or crop residues, and by tillage operations. When runoff event occurs on soil surface covered by crop residues both the mean diameter of the eroded sediment and the standard deviation are larger than under tilled and bare soil condition. This can be explain considering that the tillage operated after the corn harvest provokes a mechanical disaggregation, that breaks the compactness and the cohesive forces that impede particle detachment of smaller ones.

The soil textural analysis of the superficial soil layer corroborate the sediment quality analysis, showing that the silt fraction is significantly decreased over a period of 15 years.

Because of the selective nature of the erosion processes, soil erosion can cause a variety of environmental effects, such as loss of topsoil and soil nutrient that must be addressed, with appropriate cultivation and conservation practices.

The information derived from this research can be used for environmental and management decisions faced by farmers and land managers.