



Sediment and Phosphorus losses by Surface Runoff from a Catchment in the Humid Pampa Landscape, Argentina Republic

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The estimation of sediment and phosphorus transfers from soil into watersheds as a result of agricultural activity is a key aspect for characterizing the sustainability of current land use systems. The objective of the present study was to quantify the temporal evolution of suspended sediment and dissolved phosphorus losses from the upper basin of the Gualeguaychú River. The studied catchment has an area of 483 Km² and is located in the Entre Ríos province, Argentina Republic. The climate is subtropical humid with average annual rainfall of 1200 mm. Soils are characterized by very low infiltration rates. Land use was assessed by remote sensing and GIS tools, and consists of: 31% abandoned rice fields, 20% naturalized fields, 20% soybean (second cycle), 10% soybean (first cycle), 7% rice, 4% Pasture, and the remaining 7% is devoted to civil and road works, native forests and other crops. Low soil infiltration capacity, together with landscape geomorphological traits of the studied landscape and zonal rainfall regime, typically originates periods with high surface runoff volumes, mainly in autumn, spring and summer months. The study was conducted during a period of eight years. Instantaneous water flow measurements (discharge) were estimated in a control section of Gualeguaychú River from hydrometer reading and the rating curve of height-flow. In addition, 134 water samples of 2000 cm³ were collected during the study period to analyze the concentration of suspended sediments and dissolved phosphorus. The instantaneous flow was estimated with the hydrometer reading and the application of curve of height – flow. The discharge range was from 0.14 to 128 m³/sec, indicating a high variability in the response of the catchment to seasonal rainfall. On average suspended sediment and dissolved phosphorus losses of the experimental catchment were 1.42 Mg and 0.335 Kg per hectare/year, respectively. It was also shown that few events of high rainfall that generate excess runoff were responsible for the most of recorded losses of sediment and phosphorus. Moreover, the highest exportation of sediments and phosphorus from soil to streamflow occurred in the spring and summer period. The daily losses of phosphorus or sediments were mainly explained by the amount of precipitation accumulated during the five days prior to sampling, as shown by regression analysis, and a higher coefficient of determination was obtained for samples extracted during the summer season. This response mainly has been demonstrated to be produced in periods with higher amounts of precipitation equal or greater than 35 mm arising in this season, which are characteristic for summer storms with high rain intensities, and therefore greater erosive power.