Geophysical Research Abstracts
Vol. 14, EGU2012-12324, 2012
EGU General Assembly 2012

Impact of Changes in Land Use in Hydro-physical Properties of Argiudolls of the Center of Santa Fe, Argentina

R. P. Marano, S. Imhoff, H. Micheloud, and I. Carnevale
Departamento Ciencias del Ambiente, Facultad de Ciencias Agrarias, Universidad Nacional del Litoral, Santa Fe, Argentina

In Santa Fe province (Argentina) the substitution of agricultural-grass rotations for continuous crop under no-till has become very important because vegetal residues reduces soil degradation caused by rain-drop impact. However, in Santa Fe the sequence wheat-soya seems to produce insufficient quantity of straw to avoid that problem. The objective of this research was to evaluate some soil properties to verify the changes induced by the no-till system. Evaluations were carried out in four Argiudolls, each one under a special management condition and slope grade, i.e. Place 1: plane relief (0,08%), continuous agriculture of wheat-soya under no-till (CANT1) and traditional tillage (CAT1); Place 2 plane relief (0,08%), cattle production over natural grass (CNG2) and bare soil (CBS2); Place 3 smoothly wavy relief (0,55%), continuous agriculture of wheat-soya under no-till (CANT3); Place 4 wavy relief (1,2%), continuous agriculture of wheat-soya-corn under no-till (CANT4). Rain simulators of small (RSS) and medium (RSM) size were used to determine regional values of the curve number (CN), runoff (R) and infiltration (I) rates for steady state. Tension infiltrometers (TI) with four tensions (5, 3, 1.5 and 0 cm) and double-rings (DRI) were used to compare the infiltration. Soil samples were extracted with shovel to measure aggregates stability (AS) and with cylinders to determine the soil penetration resistance (PR) curve. Important deviations of the CN were found when they were corrected by the antecedent moisture (AMC) regarding to those indicated by the SCS; there was an overestimation of R when soil moisture was low and an underestimate with high water contents. The DRI does not represent the process of the rain infiltration for the central region of Santa Fe. On the contrary, with the use of RSM or RSS an appropriate characterization is achieved, especially with RSS that has as advantage its handling easiness and versatility of the intensities to apply. Alternatively the TI can also be used to characterize infiltration, linking I at steady state with conductivity hydraulic at tension 3 and 1, 5. Tillage decreased I in CAT1 and CBS2 regarding to no-till, although in small proportion in CBS2. The fitted curves of PR indicated the coefficient corresponding to the soil bulk density variable had the greater impact in PR in CNG2, probably due to animal trampling degrades soil structure. The AE values increased according to the order CANT1<CANT4<CANT3<CNG2 standing out the effect of soil degradation caused by the traditional tillage system and the water erosion.