Geophysical Research Abstracts
Vol. 15, EGU2013-13363, 2013
EGU General Assembly 2013

Simulation of Soil Quality with Riparian Forests and Cultivated with Sugarcane

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Riparian forests are entrusted with important hydrological functions, such as riparian zone protection, filtering sediments and nutrients and mitigation of the amount of nutrients and xenobiotic molecules from the surrounding agro ecosystems. The soil was sampled in the depths of 0-0,2 and 0.2-0.4 m and its chemical (nutrient content and organic matter, cationic exchange capacity – CEC, sum of bases-SB, bases saturation, V%, and aluminum saturation, m%); physical (particle size distribution, density and porosity) and microbiological attributes (basal respiration and microbial biomass) were determined. This work aimed to study the liner method of combining data, figures of merit (FoM), weighing process and the scoring functions developed by Wymore and asses the quality of the soil (SQI) by means of chemical, physical and microbiological soil attributes, employing the additive pondered model for two areas of riparian forest at different stages of ecological succession and an adjacent area cultivated with sugar cane, located on the dam shores of Sugar Mill Saint Lucia-Araras/SP. Some hierarchical functions containing FoMs and their parameters were constructed, and from them weights were assigned to each FoM and parameter, in a way that cluster of structures with the same FoMs and parameters with different weights were formed. These clusters were used to calculate the SQI for all vegetal formations considering two types of soil (Oxisol and Podzol), in that way, the SQI was calculated for each combination of vegetation and soil. The SQIs values were usually higher in the oldest riparian forest, while the recent riparian forest showed the smallest SQI values, for both types of soil. The variation of values within a combination vegetation/soil was also different between all combinations, being that the set of values from the oldest riparian forest presented the lowest amplitude. It was also observed that the Oxisols, regardless of the vegetation, presented higher SQIs values and smaller amplitude than the Podzols. It can be noted that this occurs mainly due to the amount of organic matter (OM) in the soil, that besides differ between all the vegetations and types of soil, influences many parameters used in the model. Thus, in the structures where was assigned higher weighs to OM, the SQIs values tended to present higher differences between the combinations with great amount of OM and these with small amount of OM, which can be noted clearly comparing the SQIs values from the oldest riparian forest with the other vegetations.