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Spatial dynamics chemical properties in a lowland soil under sugarcane crop

Wellington Pereira da Silva (1), Ceres Duarte Guedes Cabral de Almeida (1), Glécio Machado Siqueira (1), Karina Patrícia Prazeres Marques (2), Joel Medeiros Bezerra (1), and Brivaldo Gomes de Almeida (3)

(1) Federal Rural University of Pernambuco, Department of Rural Technology, Recife, Pernambuco, Brazil (welleng_pereira@hotmail.com; ceres@codai.ufrpe.br; gleciosiqueira@hotmail.com; joel_medeiros@oi.com.br), (2) Federal University of Pernambuco, Department of Geographical Sciences, Recife, Pernambuco, Brazil (karina_prazeres@hotmail.com), (3) Federal Rural University of Pernambuco, Department of Agronomy, Recife, Pernambuco, Brazil (brivaldo@depa.ufrpe.br)

Lowland soils are very important to sugarcane crop in rainy coastal zone in Northeast of Brazil. This soil is flat, high yield potential and high natural soil fertility. However, soil salinity problems can be occurred due to incorrect management, poor drainage and seasonal flood. The objective of this study was to evaluate spatial variability of chemical soil properties in a Gley soil under sugarcane crop. The study area is located in Rio Formoso city, Pernambuco (Brazil), at latitude 08º38'91"S and longitude 35º16'08"W, 60.45 m above sea level and average annual rainfall of 2100 mm. The region is characterized by rainy tropical, with dry summer, rainy season between May and August and temperatures ranging from 24 to 29ºC. Non-deformed soil samples were collected from the surface layer (0-20 cm) in 5 ha, total of 54 samples. The following chemical properties were studied: pH, electrical conductivity (EC), calcium, magnesium, potassium, sodium, aluminum, hydrogen + aluminum, sum of bases, cation exchange capacity (CEC), sodicity (ESP), aluminum saturation, bases saturation and total exchangeable bases. Descriptive statistics and geostatistical techniques were used to spatial modeling and construction of maps. Overall, the data appeared to be normally distributed, with the exception of Ca, Mg, K, Al and aluminum saturation. The highest coefficient of variation was found for percentage of aluminum saturation (113%) and the lowest was for Na (26.03%). The attributes that spatially dependent models were fitted to the Gaussian (pH and Ca), exponential (Mg) and spherical (base saturation and CEC), the other attributes denoted a pure nugget effect. The presence of nugget effect for most of the attributes is due of the high water table fluctuation and recharge that acts directly on the spatial distribution of them. The maps of spatial variability of chemical soil proprieties showed that EC have been influenced by different chemical elements, but sodium was the predominant element. Thus, sodium and EC had an inverse relationship.