



## **Spatial variability of soil apparent electrical conductivity (ECa) and the water table depth in an alluvial valley under different uses.**

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The apparent soil electrical conductivity (ECa), measured by contact or by electromagnetic induction (EMI), has been widely used as a variable that is correlated with physical and chemical soil properties. Therefore this property is used as a parameter in precision agriculture, to enable assessment of soil spatial variability and defining management units, allowing obtaining information about other soil properties like texture, salinity, water content, among others. These conditions are adequate to study spatial variability of data with the help of geostatistics, which models the spatial variability of soil properties, allowing the construction of spatial variability maps unbiased and with minimum variance. Thus, the goal this work was assess the variability special of electrical conductivity apparent soil (ECa) and the water table level in an alluvial valley in the brazilian semi-arid adopting different uses. The studied alluvial valley is located in Pesqueira (Pernambuco State, Brazil) and has 421.0 hectares. The main soil types occurring in the valley are: Fluvic Neosols, litholic Neossols and regolithic Neosols. Climate according to Koppen's classification is BSsh type, with total annual rainfall average of 730mm. The attributes evaluated in this study were sampled at 88 piezometric wells. The apparent soil electrical conductivity (ECa) was measured by electromagnetic induction with the EM38 device (Geonics Ltd) in vertical dipole (effective depth 1.5m). The ground water table was determined in piezometric wells with the aid of a measuring tape. Data were analyzed by using descriptive statistics and geostatistical tools. The land use map was constructed using field verification and spatialized by means of GIS. The attributes analyzed showed Normal frequency distribution. ECa readings ranged between 8 and 79 mS m<sup>-1</sup>. The major differences between the ECa values are due to the variation of water content in soil and distance from the water table at the soil surface. The water table in the study area ranged from 0.8 to 3.8 m deep. The Pearson linear correlation found for the data in the study was zero ( $r = -0.0185$ ). The Gaussian model was the best fit to the data, and the water table had the highest range value ( $a = 500.00$  m). The maps of spatial variability of water table and ECa have similar spatial behavior, indicating that where the water table is deeper at places with the lowest ECa.