Digital soil fertility mapping of the North, Northwest and Serrana state of Rio de Janeiro

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The development of methods in digital soil mapping has been an activity that's growing substantially in recent decades. The DSM is quickly evolving from the research stage to map production at various scales covering countries, regions and river basins (Lagacherie and McBratney, 2007). The prediction of classes and properties of soils in digital mapping is based on the relationship between the factors and soil formation processes. Chemical knowledge of soil attributes is a factor of great relevance for rational use of limes and fertilizers. This work's study area are the regions: north, northwest and Serrana do Estado do Rio de Janeiro, which are located between the coordinates 43 ° 22'35", 40 ° 57'27"WG, and 20 ° 45 '47"; 34'21' ° 22'S, with about 22,043 km^2. In this project, was used soil data compiled by Embrapa Solos for estimates of carbon (C), cation exchange capacity (CEC), pH, exchangeable aluminum (Al^{+3}), nitrogen (N), base saturation (V%), potassium (K^+) and phosphorus (P). The analyzed soils have low pH, high levels in Al^{+3}, and low concentrations of P, N and organic carbon. The values of CEC and V (%) were considered good for soil fertility. Exploratory data analysis identified outliers and extreme values for examining the summary statistics and box-plot graphs of the variables. In addition, was added a sensitivity analysis of ancillary data in the JUMP ® 6.0, by correlating the variables of each region with the histogram analysis and descriptive statistics, which also, identified some outliers in some of the variables in the three regions. To form the auxiliary database we used the following variables: elevation, aspect, slope, plan curvature, profile curvature, moisture content, NDVI Landsat7 bands 2, 4 and 7. The statistical parameters analyzed to evaluate the models were: AIC (Akaike's Information Criterion), RMSE (Estimated Residual Standard Error), Cp, adjusted R, F and the probability of F. The objective of this work is to generate a map-based soil fertility of the study area, through techniques of modeling and digital soil mapping.