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Prediction of erodibility in Oxisols using iron oxides, soil color and diffuse reflectance spectroscopy

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The prediction of erodibility using indirect methods such as diffuse reflectance spectroscopy could facilitate the characterization of the spatial variability in large areas and optimize implementation of conservation practices. The aim of this study was to evaluate the prediction of interrill erodibility (Ki) and rill erodibility (Kr) by means of iron oxides content and soil color using multiple linear regression and diffuse reflectance spectroscopy (DRS) using regression analysis by least squares partial (PLSR). The soils were collected from three geomorphic surfaces and analyzed for chemical, physical and mineralogical properties, plus scanned in the spectral range from the visible and infrared. Maps of spatial distribution of Ki and Kr were built with the values calculated by the calibrated models that obtained the best accuracy using geostatistics. Interrill-rill erodibility presented negative correlation with iron extracted by dithionite-citrate-bicarbonate, hematite, and chroma, confirming the influence of iron oxides in soil structural stability. Hematite and hue were the attributes that most contributed in calibration models by multiple linear regression for the prediction of Ki (R2 = 0.55) and Kr (R2 = 0.53). The diffuse reflectance spectroscopy via PLSR allowed to predict Interrill-rill erodibility with high accuracy (R2adj = 0.76, 0.81 respectively and RPD> 2.0) in the range of the visible spectrum (380-800 nm) and the characterization of the spatial variability of these attributes by geostatistics.