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Spectral analysis for the mineralogical characterization of planosols in NE Brazil

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This paper aims to conduct a spectral characterization in two soil profiles located in the northeast of Brazil proposing relations between the pedogenetic evolution and the environmental settings generated from the characteristics of Planosols analyzed and the presence of minerals identified by spectral pattern obtained in a laboratory. The methodological procedures were divided into the characterization of the study area, theoretical framework, field work with sampling, sample preparation, measurement in the laboratory, processing of spectral data, analysis and interpretation of results and a vegetation index calculation for aid in the environmental characterization. It is possible to see that: i) both profiles have similar spectral characterized patterns; ii) the horizons A and E show higher reflectance compared with B and C; iii) Minerals 2: 1 and 1: 1, such as montmorillonite and kaolinite can be identified; iv) Planosols are fragile to erosion. In both profiles, the C horizon less weathered and B horizon iluvial show intense absorption bands at 1400nm, 1900nm and 2200nm. These absorption bands indicate the existence of mineralogy 2: 1 on the horizons of the soils analyzed. In both profiles were found small peaks absorption in 2265nm, corresponding to gibbsite. The occurrence of this type of mineral is more common in highly weathered soils or old surfaces of erosion, which is reflected in small intensities of absorption observed in this analysis since these are of little-weathered soils of the Brazilian semiarid region. Spectral analysis and morphology described in the two profiles show difficulties for the growth of vegetation, which is consistent with NDVI values found, ranging from -0.32 to 0.61with a predominance of 0.19. These factors lead to the intensification of erosion. Erosion is characterized as one of the main indicators of environmental degradation, causing loss of important elements of the soil, which creates consequently a reduction in fertility. In field verification it was found splash erosion, sheet erosion,rill erosion, and gully erosion. It was concluded that spectral patterns can be used as a tool to mapping soils and the soils spectroradiometry is an efficient technique for mineralogical characterization of different kinds of soil and can, therefore, be applied to soil degradation and conservation issues.