Soil surface spectral information of Landsat imagery as an indicative of soil class discrimination

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The aim of this study was to develop and test a method based on spectral data obtained at the Landsat satellite imagery to discriminate soil classes and separate them in a studied area located in the southwest region of one of the most productive areas of the state of São Paulo, Brazil. The idea is that environmental planning and management could be improved by evaluating soil samples with sensors placed on satellites. The spectral readings were carried out at 185 points in the studied area, from which the reflectance of the satellite image was extracted. Discriminant equations were obtained in order to establish the soil class in study area. Sixteen soil classes were analyzed, of which discriminant equations comprising bands 1, 2, 3, 4, 5, and 7 of the TM5/Landsat sensor were established. The results showed that it was possible to identify individual soil classes through discriminant analysis using their spectral information obtained from surface through this methodology. Success rates above 40% were found in 14 of the 16 soil class evaluated when using information from the satellite image. When the 10 classes containing the highest number of minimum cartographic areas were used, the hit rate increased to higher than 50% for seven soil classes with a global hit rate of 52%. When the soil classes were grouped based on their parent material, the hit rate increased to 70%. Although satellite images detect only the soil surface, the results can aggregate more information on its discrimination.