



Soil classification basing on the spectral characteristics of topsoil samples

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Soil taxonomy plays an important role in soil utility and management, but China has only coarse soil map created based on 1980s data. New technology, e.g. spectroscopy, could simplify soil classification. The study try to classify soils basing on the spectral characteristics of topsoil samples. 148 topsoil samples of typical soils, including Black soil, Chernozem, Blown soil and Meadow soil, were collected from Songnen plain, Northeast China, and the room spectral reflectance in the visible and near infrared region (400-2500 nm) were processed with weighted moving average, resampling technique, and continuum removal. Spectral indices were extracted from soil spectral characteristics, including the second absorption positions of spectral curve, the first absorption vale's area, and slope of spectral curve at 500-600 nm and 1340-1360 nm. Then K-means clustering and decision tree were used respectively to build soil classification model. The results indicated that 1) the second absorption positions of Black soil and Chernozem were located at 610 nm and 650 nm respectively; 2) the spectral curve of the meadow is similar to its adjacent soil, which could be due to soil erosion; 3) decision tree model showed higher classification accuracy, and accuracy of Black soil, Chernozem, Blown soil and Meadow are 100%, 88%, 97%, 50% respectively, and the accuracy of Blown soil could be increased to 100% by adding one more spectral index (the first two vole's area) to the model, which showed that the model could be used for soil classification and soil map in near future.