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Assessment of soil organic matter through hyperspectral remote sensing data (VNIR spectroscopy) using PLSR method (Conference Paper)

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Abstract

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Soil organic matter (SOM) plays an important role in growth of plants along with healthy practices in farming and quality of soil. However, assessment of SOM is a tedious task due to its complex spatial variability and its chemical treatments. Visible-Near Infrared (VNIR) reflectance spectroscopy (RS) has normally used to determine the organic contents in soil without perilous chemicals. Consequently, VNIR spectrum reflectance is extensively foreseeable demand for precision farming. In the present study, the reflectance spectra between 350-2500nm of thirty soil samples collected from agricultural sites of Phulambri Tehsil of Aurangabad region of Maharashtra, India were acquired by using the Analytical Spectral Device (ASD) Field spec 4 spectroradiometer. The fringe channels were eliminated and continuum-removed method was used to detect the absorption channels of 400-2450nm wavebands. The spectra were smoothed by Savitzky-Golay (SG) method with first-derivative transformation (FDT). The SOM was forecasted using the partial least squares regression (PLSR) model by correlation analysis between spectral reflectance and SOM contents. The coefficient of determination before and after pretreatments was found to be 0.66 and 0.77 respectively, having respective mean-square error (RMSE) 5.49 and 5.31. The sensitive channels of SOM were found to be at wavelengths of 441, 517, 527, 648 and 1000nm. The study will be beneficial for efficient and cost effective farming and decision making. © 2017 IEEE.

SciVal Topic Prominence

Topic: Soil surveys | Near infrared spectroscopy | regression PLSR

Prominence percentile: 98.326

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First-derivative transformation | Partial Least Squares Regression | Savitzky-Golay smoothing | Soil Organic Matter | VNIR reflectance spectroscopy

Indexed keywords

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Engineering uncontrolled terms: First derivative | Partial least squares regression | Reflectance spectroscopy | Savitzky-Golay | Soil organic matters

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