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有机质对土壤光谱特性的影响研究

Effect of soil organic matter on spectral characteristics of soil

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中文摘要:

为了探明土壤有机质的光谱特征及其影响作用，从而为有机质土壤铁氧化物的定量反演提供理论依据。利用去有机质前后土壤的光谱数据，研究了有机质对土壤反射率、土壤线参数、土壤铁氧化物定量反演的影响。研究结果表明，去除有机质后，能明显提高土壤反射率，变化最明显的为可见光橙黄光波段，即570~630 nm。相关性分析也显示橙黄光波段反射率的相对变化量或差值与有机质去除量之间的相关系数要比其他波段高，相关系数最大值在600 nm。因此，建议采用570~630 nm的光谱数据进行有机质的反演；土壤线斜率在去有机质后明显降低，截距显著增大，二者变化量与有机质去除量呈极显著相关关系，可用土壤线参数预测有机质含量。有机质对铁氧化物的反演具有明显影响，特别是有机质大于20 g kg^{-1}的土壤，在进行反演时应考虑有机质对反演精度的影响，需采取有效地技术手段消减其影响作用，才能达到较好的效果。

Abstract:

To explore spectral characteristics of soil organic matter (SOM) and their effects and hence to lay down theoretical basis for quantitative reversion of organic matter and soil iron oxides, effects of soil organic matter on soil reflection rate, soil line parameters and quantitative inversion of soil iron oxides were studied in this paper by making use of spectral data of the soil before and after organic matter was removed. Results show that removal of organic matter significantly raised soil reflection rate and the change was the most obvious in the visible orange light band of 570~630 nm. And correlation analysis also shows that the correlation coefficient of removal of soil organic matter with the relative variation or difference in the orange light band was higher than that in the other light bands. The highest correlation coefficient was found at 600 nm. It is, therefore, suggested that the spectral data in light band of 570~630 nm be used for inversion of soil organic matter. Removal of SOM also lowered soil line slope and significantly increased intercept. The changes in thse two aspects were significantly related to SOM remval rate. Hence, soil line parameters can be used to predict content of SOM. The effect of SOM on quantitative inversion of soil iron oxides was significant, especially in soils with SOM content being above 2%. So in performing the inversion, it is essential to take into account effect of SOM on accuracy of the inversion and adopt some effective technologies to mitigate these effects. Only by so doing, can quantitative inversion of soil iron oxide content achieve better results.

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