Soil Salinity Mapping Using Satellite TM and Field Data in Southeastern Isfahan

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Abstract

This study aimed to evaluate the performance of TM satellite data acquired in June 2009 to map soil salinity in southeast of Isfahan province. Ground salinity data (EC) was collected within 9 pixels, covering an area of approximately 8100 m^2 using stratified random sampling technique at 53 sample sites. Spectral indices including TM bands, BI, SI1, SI2 and SI3, PC1, PC2, PC3 and also multiple linear regression modeling and maximum likelihood classification techniques were applied to the geometrically corrected image. Results of regression analysis showed that the TM band 4 had the strongest relationship with EC data (R^2=0.48) and also the relationship of the modeling image using TM 3, TM 4, TM5 and PC3 was significant at the 99% confidence level. The accuracy assessment of the stratified TM4 and modeling image into five classes including 0-4, 4-20, 20-60, 60-100 and EC>100 ds/m indicated that there was more than 86% agreement with the field measurements of EC data. Therefore, it can be concluded that the discretely classified salinity maps have higher accuracy than regression methods for identifying broad areas of saline soils, and can be used as appropriate tools to manage and combat soil salinization.

Keywords: Soil salinity, Remote sensing, Salinity index, Multiple linear regressions.

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