

MAPPING SOIL MINERALS IN THE ARID REGION USING LANDSAT ETM+

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ABSTRACT: Mapping and monitoring of soils is an important underpinning of modern day natural resource management. The objective of this research is to characterize soil minerals using the mineral detection techniques of remote sensing. Typical minerals were identified based on spectral reflectance database of soil using the ERDAS target detection options and orthogonal subspace projection method on Landsat ETM+ images. The accuracy of the results were validated with 45 soil samples collected from Beni-Swif area, South Egypt. Reflectance spectra of these samples were obtained using Shimadzu UV-3600 spectro-photometer. The visual analysis was used to detect the specific mineral comparing absorption wavelengths of the measured samples reflectance curve with those of the USGS minerals reflectance library. Results show that it is possible to detect eight soil minerals which are: Albite, Calcite, Dolomite, Gypsum, Hallosite, Kaolinite, Muscovite and Montmorillonite. The Overall Kappa Statistics for all analyses were above zero except the Gypsum shows low accuracy using this method. In the arid region, the most important component of soil is the mineral composition which directly effects on soil behavior. Remote sensing is an effective to detect soil minerals in the arid and semi arid regions.