Mapping Clay Fraction Using Hyperion Imagery in Relation To Different Kind Of Parents Material In D.I.Yogyakarta

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Abstract

Information of spatial distribution of soil texture is required in a number of applications such as hydrology, agriculture, land monitoring, etc. Soil texture is a term commonly used to designate the proportionate distribution of the different sizes of particles in a soil. According to United States Department of Agriculture (USDA) system of nomenclature these soil particles are categorized as sand, silt and clay.

This research focus in clay faction analysis. The characteristics of clay are plastis, kohesion, and has high swelling soil potential. Beside it is little in soil composition, it plays an important role in Ability for water storage and erosion vulnerabilty. Soil surveying used to based on the differences of landform, but nowdays because of remote sensing technology, soil surveys is easier to do. In order to overcome the expense of traditional soil survey and the limitations of pedotransfer functions, researchers are increasingly turning to remote sensing and, in particular, reflectance spectroscopy.

Every objects have different reflectant value that make different pattern of spectral signature. Before we identify objects from remote sensing data, have to convert the reflectan value to object identity. The objective of this research is to analyze spectral pattern of any pixel wich have different portion of clay related to different kind of parents material in Yogyakarta and also to analyze the relation with amount of clay faction and reflectances value in Hyperion imagery data.

Hyperspectral imaging is able in provide information in a narrow band and help obtaining the surface information in a timely and cost effective manner. Reflectance spectra were obtained from Hyperion Imagery. Hyperspectral processing such as FLAASH, Minimum Noise Frction, Pixel Purity Index, n-Dimensional Visualisation were used to process Hyperion data to search endmember from image. NDVI also used to reduce vegetation effect in image.

The landscape is devided into mapping units through air-photo and landscape interpretation from that sample sites are chosen to characterise the soils. We defined five different landscapes in reseach area, such as Aluvial plain, Structural hill, escarpment, karstic area, and denidational hill with different level of erotion. To study the clay content effect on reflectance value 31 different soil fields were prepared on the basis of change in landform and open land area.

Partial least squares regression was used to examine relationships between clay content and reflectance spectra and identify the waveleghts contributing to prediction of these soil properties. Each landscape have diffrent proportion of clay. We found sand domination in karstic area, and clay domination in aluvial plain. Clay fraction has not effects significantly in reflectance value of pixel.

Keyword: Hyperion, Clay, Spectral Signature, Partial Least Squares Regression