

Evaluation of hyperspectral imagery for identification and mapping of minerals in Chitral

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Mineral industry contributes a big share in the economy of the developed countries. Pakistan has enormous reserves of metallic, non-metallic minerals and fuel minerals. The major mineral commodities mined in the country are barite, bauxite, chromium, coal, dolomite, gypsum, iron ore, limestone, magnesite, marble, natural gas, petroleum, salt, and sulfur. Chitral possess a variety of geological features and have great potential of mineral reserves. Mineral mining requires advance technology to discover, explore and exploit. Remote sensing has made the work of identifying and mapping much easier as compared to previous decades. Hyperspectral imagery of EO1's Hyperion sensor is used for identification of minerals. Imaging Spectrometers or "Hyperspectral" sensors provide a unique combination of both spatially contiguous spectra and spectrally contiguous images of the earth's surface not available from other sources. Spectral responses of different resources are helpful for their identification. Image preprocessing and calibration was done using ENVI. Vegetation, snow and water bodies were delineated and masked from the image so the rest of the area was taken as rock dominant area. Bands were chosen using dimensionality reducing concepts. Mineral region i.e 200 to 250 nm of the spectrum was selected and preferred for further processing. SAM and SFF Classification techniques were implemented. Spectral library of USGS and JPL is used for spectral matching for identifying the elements in the Hyperion image. Visual interpretation techniques also used for the verification. Regional Geological map of Chitral area was used for validating the results. Mineral dominating areas were identified.