

HRS- Mineral Mapping/Signature development of Metallic minerals by Hyperspectral Remote Sensing in Uthal and Bella area, Balochistan, Pakistan.

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Abstract:

The Lasbela-Khuzdar districts with an area of over 750 sq., km is two of the richest and most geologically complex regions of Pakistan and holds vast prospects of metallic and nonmetallic minerals (Iron, Copper, Chromite, Barite & Manganese) building and decorative stones. Igneous, sedimentary and metamorphic rocks of Mesozoic and Cenozoic ages dominate the lithostratigraphic exposures in the study area. Mineralizations are found in different tectonic settings; chromite, copper, manganese, magnesite in oceanic ophiolites and barite, lead, and zinc in the continental hot spots and rifts. Beside minerals the area has substantial potential for marble, granite, basalt, brecciated serpentinized rocks, quartzite, and variegated textured limestone suitable for use as building and decorative stones.

Multispectral and hyperspectral remote sensing (HRS) have been commonly used for mineral mapping and resource exploration (van der Meer et al., 2012). Hyperspectral imagery has upheld its proficiency for thorough discrimination of various types of Earth surface materials due to hundreds of bands with high spectral resolution. Hyperspectral instruments have been gradually developed including airborne sensors such as AVIRIS and HyMAP, and spaceborne sensors such as EO-1 Hyperion.

This research is meant to produce a new data combination of hyperspectral and multispectral remote sensing, geology, and field survey for mineral mapping and signature development. Total 250 ground points had been collected, 25 for barite, 90 for manganese, 71 for copper, 46 for iron and 29 for chromite in District Bella and Khuzdar. Signature for metallic and non-metallic minerals has been developed from Landsat 08 having seven bands (07) and hyperspectral (EO-1 Hyperion) image having 242 bands. Hyperspectral imaging is the concurrent acquisition of images in many fine, contiguous, spectral bands. HRS needs an intricate sequence of data processing. The study encompasses pre-processing, data reduction, Pixel Purity Index (PPI) and endmember extraction from reflectance image of surface minerals. A signature library & mineral map of District Bella and Khuzdar has been archived for metallic and non-mettalic mineral. Accuracy has been checked and verified by comparing with ground data that has been collected.

Key Words: Urban Growth, Land use/ change and Agricultural



Biography:

I have completed my MSc in Geology from University of Karachi and doing MS in Remote sensing and Geoinformatics in Remote Sensing and Geoinformatics. I am Working as Assistant Director of Geological survey of Pakistan, Ministry of Energy, Pakistan.

[6th International Conference on GIS and Remote Sensing](#)

November 23-24, 2020 Webinar

Abstract Citation:

Saima, HRS- Mineral Mapping/Signature development of Metallic minerals by Hyperspectral Remote Sensing in Uthal and Bella area, Balochistan, Pakistan, 6th International Conference On GIS And Remote Sensing, November 23-24, 2020 Webinar.

<https://gis-remotesensing.environmentalconferences.org/speaker/2020/saima-msc-in-geology-from-university-of-karachi>