World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:15, No:12, 2021

Geological Mapping of Gabel Humr Akarim Area, Southern Eastern Desert, Egypt: Constrain from Remote Sensing Data, Petrographic Description and Field Investigation

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Abstract : The present study aims at integrating the ASTER data and Landsat 8 data to discriminate and map alteration and/or mineralization zones in addition to delineating different lithological units of Humr Akarim Granites area. The study area is located at 24º9' to 24º13' N and 34º1' to 34º2'45"E., covering a total exposed surface area of about 17 km². The area is characterized by rugged topography with low to moderate relief. Geologic fieldwork and petrographic investigations revealed that the basement complex of the study area is composed of metasediments, mafic dikes, older granitoids, and alkali-feldspar granites. Petrographic investigations revealed that the secondary minerals in the study area are mainly represented by chlorite, epidote, clay minerals and iron oxides. These minerals have specific spectral signatures in the region of visible near-infrared and short-wave infrared (0.4 to 2.5 µm). So that the ASTER imagery processing was concentrated on VNIR-SWIR spectrometric data in order to achieve the purposes of this study (geologic mapping of hydrothermal alteration zones and delineate possible radioactive potentialities). Mapping of hydrothermal alterations zones in addition to discriminating the lithological units in the study area are achieved through the utilization of some different image processing, including color band composites (CBC) and data transformation techniques such as band ratios (BR), band ratio codes (BRCs), principal component analysis(PCA), Crosta Technique and minimum noise fraction (MNF). The field verification and petrographic investigation confirm the results of ASTER imagery and Landsat 8 data, proposing a geological map (scale 1:50000).

Keywords : remote sensing, petrography, mineralization, alteration detection
Conference Title : ICHRSI 2021 : International Conference on Hyperspectral Remote Sensing and Imaging
Conference Location : Cairo, Egypt
Conference Dates : December 13-14, 2021