

Applications of Spot and ETM images Data in Detection of Gold-Bearing Alteration Zones in South Eastern Desert of Egypt

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ABSTRACT

This study is focused on application of various remotely sensed data to reveal the spectral characterizations of some basement rocks and delineating the gold bearing alteration zones in three localities in the south Eastern Desert of Egypt namely; Wadi Defiet, Gabal Hoteib and Wadi Beida areas. In general these areas are occupied mainly by Precambrian basement rocks. Gold mineralization is introduced into the listwaenite, sheared metavolcanics, and quartz veins during the sulfidization processes and the remobilization of gold took place along the thrust zones. At Gabal Hoteib area, the integrated analysis of satellite imagery, lithological, mineralogical and structural data have been applied to understand the controls of gold mineralization. whereas, the image processing of the ASTER, SPOT4 and SPOT5 data were carried out using ERDAS Imagine 2013 and ENVI 5.0 software. Resulted images have been used for detailed geological mapping and define the gold bearing quartz veins and alteration zones .On the other hand, to discriminate the basement rocks forming the two areas of Wadi Defiet and Wadi Beida , and detection of the gold-bearing quartz veins and the alteration zones, the data of field study and the processed data of ETM+ image have been applied whereas the band rationing have been carried out. The spectral signature profiles representing these rock units were also defined. The present study revealed that, the band ratio images (5/7, 5/1, 4) (Wadi Defiet area) and (5/1, 5/7, 5/4*3/4) (Wadi Beida area) are very effective in discrimination the rock units and detection of gold bearing alteration zones. This study indicates that, the gold bearing zones in the three localities are promising; more detailed exploration for gold mineralizations is needed to evaluate their potentiality.

KEYWORDS: SPOT 4; SPOT 5; ETM⁺ image; alteration zones; South Eastern Desert; Spectral signature; Egypt.

