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Lithological and Structural Mapping Related to Sediment Hosted Zn-Pb Deposits in the Tiran Basin, NW of Esfahan, Iran: Using ASTER and ETM Images Processing

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Abstract

The Tiran area is one of productive Zn-Pb basins that hosted by Early Cretaceous sedimentary rocks in south-eastern Malayer-Esfahan metallogenic belt (MEMB) of Iran. Remote sensing techniques play a major role in preparation of base maps with different geological information. The purpose of this research is the application of spectral image processing of ASTER data for lithological mapping especially host rock of mineralization and Landsat ETM image processing for mapping of structural features associated with sediment- hosted Zn-Pb deposits in the Tiran basin. Results of ASTER and ETM images processing provided a geological based map of the study area. Two types of rock including Triassic quartz- rich detrial rocks and Lower Cretaceous carbonates are mapped in the study area by using of thermal infrared (TIR) ASTER. Evaluation of visible through short wave infrared (VNIR-SWIR) ASTER based on PPI method and Matched Filter (MF) classification detected other types of rock units including argillaceous limestone, shale-siltstone, limestone and dolomite. Structures are identified by visual interpretation and band combinations (RGB: 531, 431) of ETM images. Zn-Pb mineralization occurred in limestone and siltstone related to major faults with northwest-southeast trend. These results and field investigations show that there is a genetic relationship between lithological units and faults and Zn-Pb mineralization in the Tiran basin deposits.

Keywords: Remote sensing, ASTER, ETM, Zn-Pb mineralization, Tiran basin