

Gold-Bearing Alteration Zones in South Eastern Desert of Egypt: Geology and Remote Sensing Analysis

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Abstract : Several alteration zones hosting gold mineralization are wide spreading in the South Eastern Desert of Egypt where gold has been mined from many localities since the time of the Pharaohs. The Sukkari is the only mine currently producing gold in the Eastern Desert of Egypt. Therefore, it is necessary to conduct more detailed studies on these locations using modern exploratory methods. The remote sensing plays an important role in lithological mapping and detection of associated hydrothermal mineralization particularly the exploration of gold mineralization. This study is focused on three localities in South Eastern Desert of Egypt, namely Beida, Defiet and Hoteib-Eiqat aiming to detect the gold-bearing hydrothermal alteration zones using the integrated data of remote sensing, field study and mineralogical investigation. Generally, these areas are dominated by Precambrian basement rocks including metamorphic and magmatic assemblages. They comprise ophiolitic serpentinite-talc carbonate, island-arc metavolcanics which were intruded by syn to late orogenic mafic and felsic intrusions mainly gabbro, granodiorite and monzogranite. The processed data of Advanced Spaceborne Thermal Emission and Reflection (ASTER) and Landsat-8 images are used in the present study to map the gold bearing-hydrothermal alteration zones. Band rationing and principal component analysis techniques are used to discriminate the different lithologic units exposed in the studied three areas. Field study and mineralogical investigation have been used to verify the remote sensing data. This study concluded that, the integrated remote sensing data with geological, field and mineralogical investigations are very effective in lithological discrimination, detailed geological mapping and detection of the gold-bearing hydrothermal alteration zones. More detailed exploration for gold mineralization with the help of remote sensing techniques is recommended to evaluate its potentiality in the study areas.

Keywords : pan-african, Egypt, landsat-8; ASTER, gold, alteration zones

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