

Abstract

Remote sensing investigations combined with Geographical investigation systems (GIS) have become more important for the study of geological mineralization and structural geology like lineaments. Automatic extraction of lineaments from satellite imagery help in giving an overview of the tectonic events in the study area. The main objective of the study was to map hydrothermally altered rocks and geological structures that may be associated with mineral deposits in Mwitika-Makongo area. The study involves the use of Landsat- 8/OLI image. The satellite images were classified using ENVI 5.3 and ArcGIS 10.5. PCI geomatics 2016 was used for extraction of lineaments while Rose diagram was generated using Rockworks 16. Different remote sensing techniques, such as colour composite, band ratio and principal component analysis were applied to identify geological units and features related to economic mineralization. Colour composite band combination (5, 6, 7) showed hydrothermally altered geological units as blue. Band ratio combination (4/2, 6/7, 6/5) showed the areas that were hydrothermally altered as blue. Lineament mapping was done using PCA, with the first three PCs having the highest percentage of Eigenvalues. A lineament density map showed higher values in Makongo hill followed by Kalima Kathei hill. The structural trend from the rose diagram is in the NE direction. The results of image analysis and lineament extraction show that the economic minerals like iron ore are located in areas of hydrothermal alterations where intrusive rocks like Pyroxenite were found.