



## Integration of Remote Sensing and Geological Mapping for Economic Mineralization Mapping in Mwitika-Makongo Area, Kitui County.

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### Abstract

This study integrates geology with remote sensing techniques to establish geological structures and their associated economic mineralization in the Neoproterozoic rocks of Mwitika-Makongo area, Kitui County. The first objective of this study was to map hydrothermally altered zones and extract lineaments from Landsat 8/OLI of the study area. The second objective was to geological map the area and validates the output with geochemical analysis. The remote sensing methods included; band ratios and combinations, principal component analysis followed by lineament extraction. Geological methods consisted of, field mapping and geochemical analysis. The integrated techniques have resulted in lithological discrimination of hydrothermally altered zones.

### Keywords

Remote Sensing, Neoproterozoic, Landsat-8/OLI, hydrothermally altered, X-Ray fluorescence.

Chemical analysis using X-Ray fluorescence, for some selected mineralized samples followed by Pearson correlation matrix of the chemical data gave a strong correlation between Fe<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub> and P<sub>2</sub>O<sub>5</sub> indicating that their mode of delivery in the area could be similar, with a likely source from hydrothermal fluids whose source is magmatic intrusions in the area. These results confirmed the findings from remote sensing studies on hydrothermal alteration. It was therefore concluded that integration of remote sensing techniques and geological field mapping provide a tool for delineating economic mineralization in Neoproterozoic rocks.

Band 5/6 ratio show greenish areas as being dominated by Fe-Mg silicate minerals like olivine and pyroxene useful in delineating intrusive rocks in the area.

## Introduction

Geological field mapping and geochemical investigations in these zones led to the interpretation of some iron mineralization in hydrothermally altered zones, especially around Kalima Kathei. It also led to the conclusion that lineaments control drainage patterns in the area.

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