Possibility of Using Remote Sensing Techniques as a Tool in Exploration of Marble Deposits in Sri Lanka

P.G.S.C. Amarasiri[1]*, R.G.C. Jaliya E.P.S.K. Ediriweera[2]

'Department of Science and Technology, Uva Wellassa University, Badulla, Sri Lanka
'Department of Computer Science and Technology, Uva Wellassa University, Badulla, Sri Lanka

Remote sensing with the aid of hyper-spectral data are widely used in mineral exploration. However in Sri Lankan context remote sensing has not been used for mineral exploration due to nonexistence of most of required data and the vegetation cover is one of the major factor that limit the remote sensing approach. From that, the study area Balangoda and Mathale consist of rapid variation in elevation that may cause shadow effect which restrict the reflection of solar radiation. This study investigates the possibility of using freely accessible multispectral data for marble exploration. Classification techniques and topographical features were used to locate calcite and dolomite occurrences in the study area. Shuttle Radar Topography Mission (SRTM) data were used for topographic feature identification and Sentinel-2 data were used for accurate classification. Anticline-syncline formations and fractured zones were identified using SRTM data. Effective classified images were obtained from Sentinel-2 and Landsat-8 data processing. Training polygons was used to extract the spectral signature in each data set. Although direct spectral signatures of calcite and dolomite are not prominent in remote sensing images, indirect indicators help in delineating possible mineralizing zones. Decision tree for each data set was used in classification process. This study proves that using relatively high resolution data acquired from Sentinel-2 can be used for more effective classification than Landsat-8 data sets in mineral explanations.

Keywords: Remote sensing, Mineral exploration, Marble, SRTM, Landsat-8, Sentinel-2.