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DIGITAL ANALYSIS OF LANDSAT DATA FOR GEOLOGICAL STUDIES IN SANGAGIRI-TIRUCHENGODE-NAMAKKAL AREA IN TAMILNADU, INDIA

V. GURUSWAMY, S. J. KRISTOF, AND M. F. BAUMGARDNER

The Laboratory for Applications of Remote Sensing, Purdue University, West Lafayette, Indiana, 47906

Applications of remote sensing, especially digital analysis of multispectral scanner data to the discipline of geology, require a careful analytical approach in view of the various limitations like the inevitable masking effect due to several surficial features, fluctuating environmental conditions, etc. As such, anticipation of limited accuracy in respect to qualitatively extracting lithologic informations becomes the principal objective of the analyst at the first instance.

Attempts were made in the paper to study the domal structure area studded with four granite/gneiss varieties and alluvium and to delineate their lithological boundaries based on their spectral characteristics using the LARSYS hardware and software facilities. The Landsat imagery (scale 1:500,000) and the field geological map (scale 1:250,000) formed the main field information sources aiding the digital analysis.

The output obtained from the supervised technique and unsupervised techniques were compared. In the unsupervised technique, ten training areas (each having about 2000 to 3000 pixels and 6 classes) within the area of study (areal extent being 125,000 pixels) were selected and clustered separately using LARSYS Eigencluster processor. The statistics of the ten training areas were merged and using a transformed divergence values 1200 and 1500 in stages in the separability function, the classes were finally reduced to 9 classes. Biplots showing the ellipse plots in channels 2 and 4 and classify plots in channels 2 and 4 are found to reveal the possibilities of having common overlapping position wherein the flowing river water and shallow stagnant turbid water having less turbidity and less bed reflection have similar spectral characteristics. Similarly, the granitoid gneiss with pegmatite overlaps with coarse soil and cloud. Also, the coarse soil overlaps with cloud and vegetation; the allivium with vegetation, irrigated crop.

Field geological maps represent subsurface bedrock features and as such supervised classification based on such informations without depicting the masking effects by soil, vegetation, etc. does not seem to give tangible results except in the vast rock outcrop portions. Unsupervised approach with refinement of training areas appears to yield relatively better results; in certain situations, a limited field check may prove more successful.