Optimum Band Selection for Image Visualization of Multispectral Data in Relation to Natural Resources Management

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SUMMARY

The Landsat TM multispectral data and MASTER (MODIS/ASTER Airborne Simulator) hyperspectral data have been widely used to observe earth surface, it is important to select the best possible three-band combination that can provide useful information on natural resources for display and visual interpretation. However, deciding the best three-band combination for visualization is relatively difficult and time consuming especially for MASTER data. In this paper, an algorithm of the best three-band selection for Landsat TM and MASTER image visualization is proposed. This algorithm uses the degree of between-cluster separability in a spectral band and correlation coefficient to compute the statistical parameter called the 'Best Three Bands Combination Index' (BTBCI). The highest value of BTBCI should be the three bands having the most information content. This algorithm was compared with another statistical method called 'Optimum Index Factor' (OIF). Comparison results show that the band combination 1, 4 and 5 were found to be the top rank in the BTBCI and OIF for Landsat TM data. But, the ranking results were significantly different when applied to the MASTER data; band combination 3, 7 and 20 were top rank in the BTBCI and 8, 22 and 42 for OIF. The display quality of these two images was different where band combination 3, 7 and 20 is smoother than band combination 8, 22 and 42.

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