

Adaptive Threshold-Based Shadow Masking for Across-Date Settlement Classification of Panchromatic QuickBird Images

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Abstract

Multitemporal land-use analysis is becoming increasingly important for the effective management of Earth resources. Despite that, consistent differences in the viewing and illumination geometry in satellite-borne imagery introduce some issues in the creation of land-use classification maps. The focus of this letter is settlement classification with high-resolution panchromatic acquisitions, using texture features to distinguish between settlement classes. The important multitemporal variance component of shadow is effectively removed before feature determination, which allows for minimum-supervision across-date classification. Shadow detection based on local adaptive thresholding is employed and experimentally shown to outperform existing fixed threshold shadow detectors in increasing settlement classification accuracy. Both same- and across-date settlement accuracies are significantly improved with shadow masking during feature calculation. A statistical study was performed and found to support the hypothesis that the increased accuracy is due to shadow masking specifically.