

Land Cover Changes in Chiayi County Revealed by An Object-based Change Detection Method

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Land cover (LC) changes are dynamic and unpredictable processes over time. The application of satellite imagery may provide a good reference for the government to detect surface coverage changes in near real-time. However, existing object-based change detection methods require time-consuming parameter adjustments and visual confirmation of segmentation accuracy during image segmentation. Additionally, while relying on sophisticated tools such as artificial intelligence, the process lacks transparency, making it challenging to sort out the importance of changing features. Therefore, this study aims to develop an object-based direct detection method to address these limitations. The proposed approach generates LC change maps based on object-based change detection techniques using SPOT-7 imagery to identify areas with abrupt changes in Chiayi County in southern Taiwan. In this study, precision evaluations are conducted in three scenarios: (1) change detection with relative radiometric correction and feature screening, (2) change detection without radiometric correction and feature screening, and (3) change detection without radiometric correction but with feature screening. The study seeks to identify changes in agricultural land coverage and human-induced changes in land use coverage. Moreover, the change detection accuracy under the three tests is 80%, 77%, and 86%, respectively. Among the three tests of our results, it is noteworthy that the CD accuracy after relative radiometric calibration is less effective compared to CD without that.

Keywords: Change Detection, Image segmentation, Multivariate Analysis, SPOT-7