

## Multi-Temporal Urban Land Cover Mapping Using Spectral Indices

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**Abstract :** Multi-temporal urban land cover mapping is of paramount importance for monitoring urban sprawl and managing the ecological environment. For diversified urban activities, it is challenging to map land covers in a complex urban environment. Spectral indices have proved to be effective for mapping urban land covers. To improve multi-temporal urban land cover classification and mapping, we evaluate the performance of three spectral indices, e.g. modified normalized difference bare-land index (MNDBI), tasseled cap water and vegetation index (TCWVI) and shadow index (ShDI). The MNDBI is developed to evaluate its performance of enhancing urban impervious areas by separating bare lands. A tasseled cap index, TCWVI is developed to evaluate its competence to detect vegetation and water simultaneously. The ShDI is developed to maximize the spectral difference between shadows of skyscrapers and water and enhance water detection. First, this paper presents a comparative analysis of three spectral indices using Landsat Enhanced Thematic Mapper (ETM), Thematic Mapper (TM) and Operational Land Imager (OLI) data. Second, optimized thresholds of the spectral indices are imputed to classify land covers, and finally, their performance of enhancing multi-temporal urban land cover mapping is assessed. The results indicate that the spectral indices are competent to enhance multi-temporal urban land cover mapping and achieves an overall classification accuracy of 93-96%.

**Keywords :** land cover, mapping, multi-temporal, spectral indices

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