

[Available Issues](#) | [Japanese](#)

Author: [ADVANCED](#) | Volume Page
Keyword: |



[TOP](#) > [Available Issues](#) > [Table of Contents](#) > **Abstract**

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Accuracy Assessment for Land Cover Classification Through Correction and Multi-temporal Images

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Abstract

A qualitative accuracy assessment for land cover classification was conducted to evaluate (i) the performance when applied to topographically and non-topographically diverse areas using Landsat ETM+ images, and (ii) the relative applicability of multi-temporal images in the mountainous area of northern Japan. Five Landsat ETM+ images from 2000 to 2004 were used to characterize six categories : water, conifer forest,

agriculture, paddy and urban. The removal of topographic effects from the image before the classification resulted in only slightly more accurate results. Topographic correction was not essential for land cover classification using Landsat ETM+ because habitat formation of several species already had strong relationships with topographic factors, such as slope, aspect and elevation, in heavy snowfall areas. On the other hand, the use of multi-temporal Landsat ETM+ images significantly improved classification accuracy. Overall accuracy and kappa coefficient rose from 0.519±0.044 with a single image up to 73.7% and 0.628 with five images. The best performance was attained when combining all five images. Multi-temporal images enhanced the ability to discriminate categories that are inseparable in a single image. Moreover, as clouds were rarely at the same place, an overlay procedure of multi-temporal images was useful for creating a cloud-free composite image. This method of land cover of large areas. However, the classification accuracy did not increase with increasing the number of images. Classification accuracy tended to saturate with three images. At least two or three images are needed to produce a more accurate land cover map from the perspective of cost optimization. This study underlines how multi-temporal analyses of Landsat ETM+ images can be used for a rapid operation for land cover classification without the need to employ topographic correction techniques. This type of research information would be critical for utilization of remotely sensed data for land cover classification.

Keywords: [land cover classification](#), [Landsat ETM+](#), [multi-temporal images](#), [topographic correction](#)

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