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Mapping Effective Leaf Area Index of Lodgepole Pine of Alberta using Landsat-TM and MODIS Data

T.Y. Gan
U of Alberta, Edmonton, Canada (tgan@ualberta.ca)

Thian Yew Gan1, Jingbin Li1, and Uldis Silins2

1Department of Civil and Environmental Engineering, University of Alberta, Edmonton Alberta T6G 2W2 Canada
2Department of Renewable Resources, University of Alberta, Edmonton, Alberta, Canada

Abstract
This study developed relationships between ground measured, effective Leaf Area Index (LAIe), an important parameter for describing many physical and biological processes related to vegetation on the earth's surface, and vegetation indices derived from MODIS and Landsat-TM5 for the lodgepole pine in Alberta, Canada. The results show that Landsat-TM5 data can retrieve more consistent LAIe than MODIS data over lodgepole pine regions of west-central Alberta probably because of its higher resolution (30m) than MODIS (250m to 1 km) data. The uncertainties associated with these retrieval algorithms due to errors in ground-based measurements and remotely sensed (RS) data, scale mismatch between them, and the complexity of vegetation structure are also analyzed. By developing appropriate retrieval algorithms for LAI from satellite data, we can possibly map this vegetation type of Alberta and other parts of Canada useful for forest management with good spatial and temporal coverage at reasonable cost and time.