

## Regional and temporal evaluation of MODIS LAI products in Finland

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Leaf area index (LAI) maps are essential input data for various climate and land surface models. Moderate Resolution Imaging Spectroradiometer (MODIS) is used routinely to produce a global-scale LAI product (MODIS LAI) at 1 km spatial and 4 and 8 days temporal resolution. The validation of the LAI estimates provides important feedback for the development of mapping algorithms, and hence it is important to continue validation work as new products and versions become available. In this study, we provide regional and temporal evaluation for the most recent MODIS LAI products (collection 5) over boreal coniferous-dominated forests in Finland. First, we compared MODIS LAI with the countrywide fine resolution LAI maps (25 m resolution). The LAI maps are based on an empirical model calibrated by field measured LAI and reduced simple ratio (RSR) vegetation index calculated from Landsat and SPOT images [1]. The model was applied to IMAGE2000 and 2006 satellite image mosaics provided by the Finnish Environmental Institute. The final maps have been corrected for shoot-level clumping in coniferous and mixed forests according to the land cover maps. Mean forest LAI was calculated for each MODIS 1 km pixel having >50% of forest (Fig. 1). Next, we validated the MODIS LAI in Hyytiälä in southern Finland for the growing season in 2010. The seasonal LAI measurements were upscaled to the MODIS spatial resolution using a time series of nine fine resolution SPOT and Hyperion images. According to the results, MODIS LAI show larger values than the Finnish LAI maps. Furthermore, the results emphasize the importance of standardizing LAI definitions when comparing the different LAI products.

- [1] J. Heiskanen, M. Rautiainen, L. Korhonen, M. Mõttus, and P. Stenberg, “Retrieval of boreal forest LAI using a forest reflectance model and empirical regressions”, *Int. J. Appl. Earth Obs.*, vol. 13, pp. 595-606, 2011.

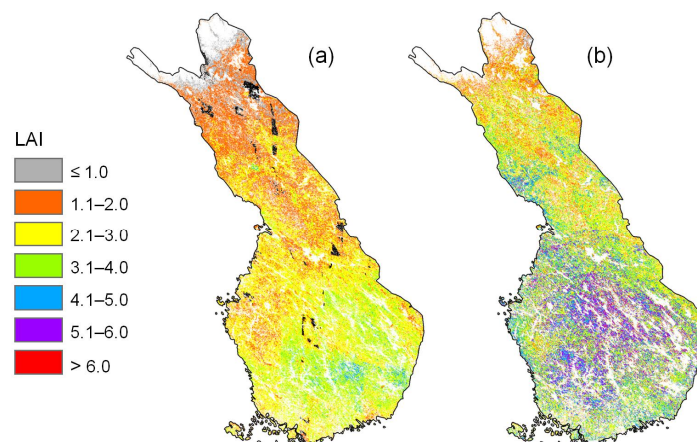


Fig.1. (a) Finnish LAI map (2006) and (b) MODIS LAI (July average 2002–2010).