

## Estimation of leaf optical properties from satellite observations for the Common Land Model

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Common Land Model (CoLM) predefines the leaf optical parameters and produces large errors in simulating canopy radiance when comparing remote sensed observations. We present an effective scheme to estimate those parameters directly from Moderate Resolution Imaging Spectroradiometer (MODIS) products. We use broadband surface albedo and reflectance products as observations, and utilize smoothed leaf area index (LAI) products as prior knowledge to invert two-stream approximation model (2S), which describes process of canopy radiance in CoLM. But exclusive albedo products result in deficient observations when converse, so reflectance products add extra information to offset deficiency in the scheme. In this paper, MODIS products from more than 2000 global stations were applied to invert leaf optical parameters based on canopy types of International Geosphere-Biosphere Program (IGBP). From the retrieval of annual leaf optical character, it varies obviously in a year, which means the invariance of leaf optical parameters predefined in CoLM is incorrect. The leaf optical character of cropland, grassland, mixed forest and deciduous broadleaf forest of IGBP represent a large variance in broad visual and near- infrared band, which can be explained by variance of chlorophyll content and leaf thickness with leaf ages. But for savanna or woody savanna of IGBP, the retrieval show fluctuation. These types mainly cover semitropical region, and are influenced by rainy season, which may be different in Africa, Australia and Asia. So, when make statistics of leaf optical parameters, the different variance results in fluctuation for savanna. For evergreen types, the stableness of leaf optical character matches invariance chlorophyll content and leaf thickness. Also, comparison of 2S and MODIS show improvements required, but it can not be improved only by amending leaf optical parameters because the 2S over- estimates canopy radiance.

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