Abstract. MODIS LAI algorithm was substantially refined for the Collection 5 (C5) representing to optimally use suite of MODIS observations from Terra and Aqua sensors. Revisions are based on advancements in BT theory, and the C5 suite of LAI/FPAR products possesses higher quality retrievals than previous versions. The following 1-km products are operationally generated at NASA Science Computing Facilities (SCF): 5-day Terra and Aqua products, 5-day Combined Terra and Aqua product, and 4-day (Combined) Terra and Aqua product. In addition, monthly Collection 5 Terra products are processed and archived at the Boston University (BU) SCF. We analyzed Collection 5 LAI/FPAR products and compared them with the earlier Collection 4 LAI/FPAR products over a range of spatial and temporal scales: Global annual mean, Global monthly time-series, biome-based Global and Northern Hemisphere (-35°N) analysis. For analysis we used Collection 4 (C4.1) and Collection 5 (C5) BU monthly Terra products. The BU SCF has also been involved in the generation and evaluation of a new global monthly leaf area index (LAI) data set for the period July 1991 to December 2006 derived from AVHRR Normalized Difference Vegetation Index (NDVI) data. This is based on the separate transfer theory of canopy optical transmittance. This LAI data set was evaluated both by direct comparisons to ground data and indirectly through inter-comparisons with similar data sets. The indirect validation showed satisfactory agreement with existing LAI products – MODIS C5 LAI, at a range of spatial scales. The data set represents well-documented spatio-temporal trends and inter-annual variations in vegetation activity in the northern latitudes and semi-arid tropics. Overall, the inter-comparison with short-term LAI data sets, evaluation of long term trends with known variations in climate variables, and validation with field measurements together build confidence in the utility of the new 20-year LAI record for long-term vegetation monitoring and modeling studies.

Temporal and spatially averaged RI (%) of six biomes for Collection 4 (C4.1) and Collection 5 (C5).


Time series of LAI (left) and FPAR (right) for Collection 4 (C4.1) and Collection 5 (C5). Top: Global - all vegetated pixels. Middle: Two biomes – Grasses & Cereals, and, Broadleaf Forests. Bottom: Two biomes in the Northern Hemisphere (-35°N) – Broadleaf Forests and Needleleaf Forests.

Collection 5 MODIS LAI/FPAR

JOINING LAI FROM AVHRR NDVI AND MODIS SURFACE REFLECTANCE

VALIDATION WITH FIELD DATA

TABLE SHOWING THE SITES USED FOR VALIDATING THE AVHRR LAI PRODUCT.

References:

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