

# MONITORING VEGETATION STATE AND DISTURBANCE USING THE MOD44 PRODUCT SUITE

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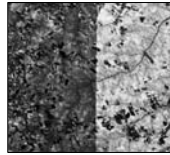
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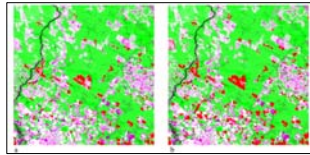


Under a contract entitled "Enhanced Land Cover and Land Cover Change Products from MODIS", investigators at the University of Maryland and South Dakota State University have developed a suite of products characterizing vegetation state and changes due to natural and anthropogenic processes. The MOD44 products include Vegetative Cover Conversion (MOD44A) which is a land cover change alarm product; Vegetation Continuous Fields (MOD44B) which provides estimates of sub-pixel land cover components; and MOD44C which is a 16-day surface reflectance composite product used to derive the VCC and VCF products. This poster provides examples of recent products as well as planned enhancements based upon the Collection 5 re-processing of the MODIS record which is currently underway.

## Improved Change Detection Accounting for BRDF

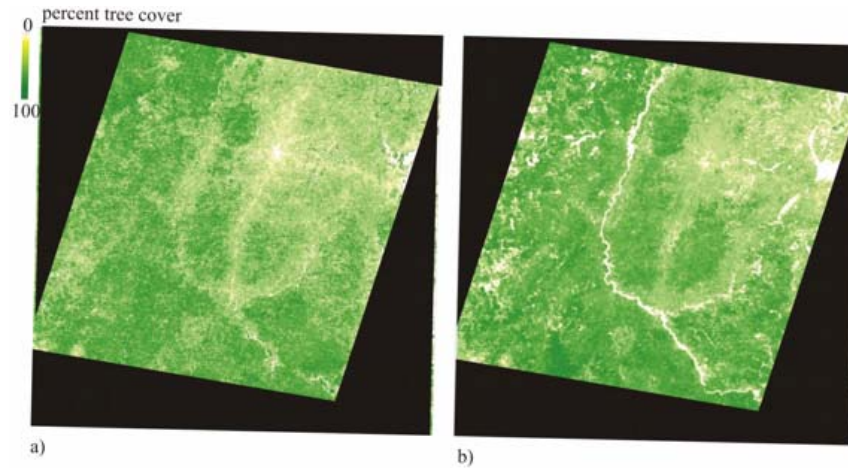


This near infrared example from the Brazilian Amazon shows the effect of BRDF on a 16 day composite. By not accounting BRDF, this 2-5% difference in reflectance is sufficient to confuse land cover change detection algorithms.



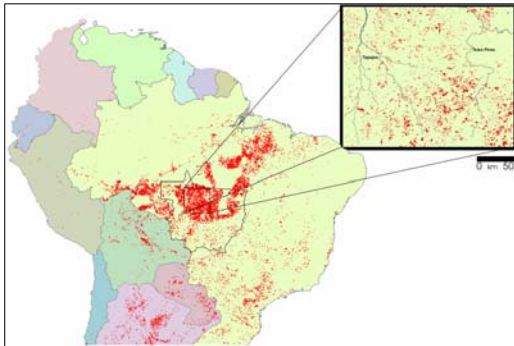
Full resolution image of the 2001 - 2005 change detection in Mato Grosso, Brazil. Image in (a) depicts the standard MODIS VCC; (b) depicts improved results using a ratio method to mitigate BRDF. Areas that have changed are shown in red in both images. Note the increased area and additional change observations in (b). The MOD44B change products derived under Collection 5 will incorporate enhanced compositing methods to mitigate BRDF effects.

## Regionally Tuned Vegetation Continuous Fields Improve Estimate in Transitions



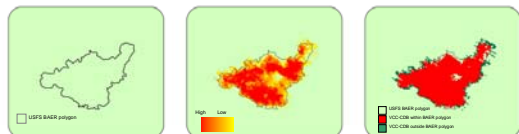
Global and biome-specific VCF tree cover maps covering the footprint of Landsat path/row 172/068 on the Congo and Zambia border where a) is the global product, and b) is a biome specific map for the tropical savanna and woodland biome. These biome-specific solutions will be produced for the Collection 5 version of VCF.

## Five Year VCC Showing Tropical Deforestation



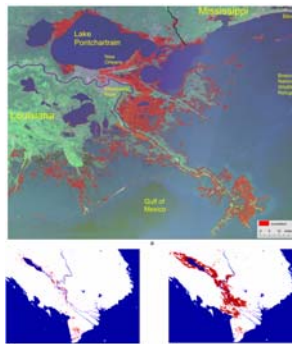
MODIS VCC showing deforestation for South America from 2001 to 2005. The outline box in the large image shows the location of the full resolution data in the upper image from Mato Grosso, Brazil. Change is shown in red. Multi-year change products will be produced as part of Collection 5.

## Validating VCC - Change Due to Burning



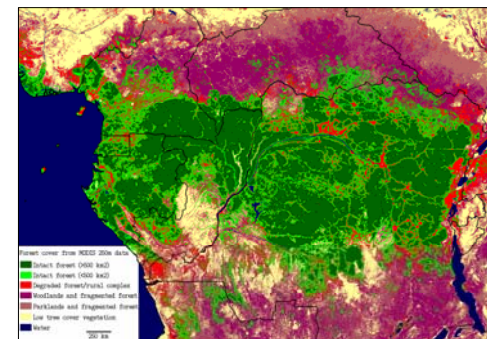
VCC-CDB validation using USDA Forest Service Burned Area Emergency Rehabilitation polygons for the Snow fire. In this case, VCC-CDB mapped over 92% of the area mapped by the BAER polygon with less than 15% commission error. BAER polygon depicts the final containment line and does not account for unburned islands, which explains much of the discrepancy between the two data sets.

## VCC - Inundation Product: Daily Detection is Critical



a) MODIS detected persistent inundation from Hurricane Katrina in Louisiana, September 2005. The background image is a mosaic of Landsat scenes, inundated areas are shown in red. Images in b) and c) are from Southeast Asia in September, 2002. b) shows the result when a 16-day composite image is used as the input to the water detection algorithm. c) shows the result when water detection is performed on a daily basis. Only by using daily data can one capture the extent of inundation.

## Vegetation Continuous Fields Disturbance Product Depicts the Extent of Forest Degradation and Subsequent Regeneration



Forest intactness map for Central Africa created with five years of MODIS 250 meter time-series data sets. The standard VCF tree cover layer is updated using a set of high-resolution training labels to drive the mapping of forest regrowth and plantations.

VCC and VCF data sets are available from the LP-DAAC and the Global Land Cover Facility ([www.landcover.org](http://www.landcover.org))

