

**SEMI-YEARLY REPORT**

**(for January - June 2001)**

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Enhanced Land cover and Land Cover Change products from MODIS  
Post Launch Studies

by

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**1. At-launch Land Cover Product.**

a. Task Objectives:

The principal objective of this task is to supply a validated at-launch land cover product based on the AVHRR at a resolution of 1 km.

b. Task Progress:

The AVHRR-derived at-launch land cover has been used for Collection 1 processing of the early MODIS record. The only issues reported are related to inconsistencies between the land/sea mask used for the 1km AVHRR Pathfinder data set and the EOS land/sea mask.

c. Anticipated Activities During the Next Semi-year:

Land cover studies will mainly focus on the development of the vegetation continuous fields which is a MODIS post-launch product. Major activities are presented in part 3 of this report.

**2. Land cover change indicator product.**

a) Task objectives

i) Generation of test data sets.

ii) Production and testing of the at-launch change detection algorithm.

iii) Production and testing of post-launch change detection algorithm, Vegetative Cover Conversion.

b) Task progress

i) Totally 12 sets of test data have been generated and archived for use.

ii) Using data from the MODIS 250m production system, the VCC algorithms were applied to cases of wildfire (Cerro Grande and Idaho/Montana fires), flooding (Cambodia and Thailand), and deforestation (Brazil). These were analyzed and results were submitted for inclusion in a MODLAND special issue of Remote Sensing Environment. In the case of the wildfire examples, vector burn perimeter data was obtained from the USDA Forest Service to validate results.

Zhan, X., Sohlberg, R., Townshend, J.R.G., DiMiceli, C., Carroll, M., Eastman, J.C., Hansen, M., and DeFries, R.S. Detection of land cover changes using MODIS 250m data, *Remote Sensing Environment*, in press.

Additional work was conducted to characterize Mississippi River floods of April 2001. Results were presented in the following:

Sohlberg, R., Zhan, X., DiMiceli, C., Carroll, M., Townshend, J., Eastman, J., Hansen, M., and DeFries, R. 2001. Change detection for flood and burning events using MODIS 250m data and the Vegetative Cover Conversion algorithm. **American Geophysical Union Spring Meeting**, Boston.

iii) Algorithm updates continue based on the results obtained running VCC with the at-launch version of the code. These refined results were distributed via a web interface at <http://www.geog.umd.edu/landcover/modis>. Both input data and VCC results are available.

c) Anticipated Activities during the Next Semi-year

i) No more actions on test data generation are planned.

ii) No more activity related to the at-launch version of VCC is planned. Future activities will concentrate on taking lessons learned and incorporating them into future versions of the post-launch algorithm.

iii) During the next period we will concentrate on refining input data sets and change detection algorithms. VCC is driven by 16-day surface reflectance composites which must be optimized to reduce cloud contamination and maximize spatial resolution. Collaboration is continuing with Eric Vermote and Nazmi El Saleous to make best use of the L2G surface reflectance product in this regard.

The second major emphasis for the coming period will be refining VCC methods based on the early 250m data record.

### **3. Continuous fields of land cover properties**

#### a) Task objectives

Generation of continuous fields of land cover attributes, Vegetation Continuous Fields.

#### b) Task progress

Work continues to develop a 500m tree cover product based on the methods employed for the heritage 1km product derived from AVHRR. A new method, continuous training, is being employed to better characterize tree cover at the low and high end of the spectrum. An annual data set is being assembled using the Collection 1 data stream. This is being used to prototype the Collection 3 product.

A high resolution validation and training data set is being assembled using Landsat 7 and Ikonos.

Planning efforts have been conducted for a summer field campaign to collect tree cover validation data in a range of biomes in the western U.S.

Early results were presented as follows:

Hansen, M.C., DeFries, R.S., Townshend, J.R.G., and Sohlberg, R.A. 2001. Using continuous fields of tree cover to assess degradation within ecoregions: An example from South America. **American Geophysical Union Spring Meeting**, Boston.

Townshend, J., Hansen, M., DeFries, R., Sohlberg, R., Desch, A., and White, B. 2001. Monitoring the extent of forests on national to global scales. **American Geophysical Union Spring Meeting**, Boston.

Finally, two papers focused on VCF and its uses were prepared for submission to the MODLAND special issue of Remote Sensing Environment.

Hansen, M.C., DeFries, R.S., Townshend, J.R.G., Sohlberg, R., DiMiceli, C., and Carroll, M. Towards an operational MODIS continuous field of percent tree cover algorithm: Examples using AVHRR and MODIS data, **Remote Sensing Environment**, in press.

Hansen, M.C., DeFries, R.S., Townshend, J.R.G., Marufu, L., and Sohlberg, R. Percent tree cover estimates derived from high-resolution satellite data and ground measurements to validate the MODIS continuous field product: An example from Western Zambia, **Remote Sensing Environment**, in press.

#### c) Anticipated Activities during the Next Semi-year

We plan to release a beta version MODIS Continuous Fields from MODIS 500m data on July 31, 2001.

We will also be conducting field data acquisition activities as described above.

#### **4. Overguide activities.**

Several community outreach efforts continued throughout this performance period. Specifically, via the Global Land Cover Facility ESIP, we have continued to distributed a maximum NDVI 250m MODIS composite for the conterminous United States. These are distributed in an Albers Conic Equal Area projection consistent with the standard USGS projection for continental maps.

We have also become engaged with the USDA Forest Service's Remote Sensing Applications Center to utilize MODIS land cover and fire products to meet the needs of federal land managers. In April, UMD hosted a fly-in meeting of concerned parties from the RSAC and from the Missoula Fire Science Lab.

During this period we have also hosted representative of the Canadian Forest service and delegations from Russia and the Chinese Academy.