of O_3 and other atmospheric oxidants since the industrial revolution may have triggered an increase of atmospheric Hg emissions and re-emissions from natural substrates during the same time period.

B21E MCC: Level 2 Tuesday 0830h

Validation and Application of Land Surface Products From the MODIS Sensor I Posters *(joint with H, GC)*

Presiding: **F A Heinsch,** University of Montana**; J L Privette,** NASA Goddard Space Flight Center

B21E-0751 0830h POSTER

Land Surface Product Validation Using the DOE ARM Southern Great Plains Site

Robert Knuteson[1] (robert.knuteson@ssec.wisc.edu)

Henry Revercomb[1] (hankr@ssec.wisc.edu)

David Tobin[1] (davet@ssec.wisc.edu)

Brian Osborne[1] (briano@ssec.wisc.edu)

[1]Uni. of Wisconsin - Madison, Space Science & Engineering Ctr 1225 W. Dayton St., Madison, WI 53706, United States

The University of Wisconsin Space Science and Engineering Center (UW-SSEC) is making use of the U.S. Department of Energy Atmospheric Radiation Measurement (DOE ARM) program Southern Great Plains (SGP) site for validation of NASA EOS land surface products. The DOE ARM site covers a 250 km square region that includes most of Oklahoma and southern Kansas. The site is dominated by a mixture of vegetation and bare soil with a vegetation fraction that changes with the growing season. The land use is divided between cattle ranching (permanent pasture) and wheat farming (seasonal). The DOE ARM site provides routine state-of-the-art vertical profile measurements of the atmospheric state. Special radiosonde launches have been conducted by DOE ARM to coincide with overpasses of the NASA Aqua platform. The UW-SSEC has provided ground truth measurements of surface characteristics using a mobile research vehicle (the AERIbago) during several aircraft field campaigns. The UW-SSEC Scanning High-resolution Interferometer Sounder (S-HIS) has provided high altitude observations of the thermal infrared spectrum for comparison to satellite observations. Coincident measurements of ground-based and aircraft observations with AIRS and MODIS satellite observations have been obtained during TX-2001, TX-2002, and IHOP. Preliminary land surface products from AIRS will be compared with MODIS land products and the validation measurements obtained from aircraft and ground-based sensors.

URL: http://airs3.ssec.wisc.edu/~airs/lste

B21E-0752 0830h POSTER

Data Supporting the Validation of MODIS Land Products

Larry D. Voorhees[1] (865-574-7309; voorheesld@ornl.gov); Robert B. Cook[1] (865-574-7319; cookrb@ornl.gov); Susan K. Holladay[1] (865 576-8356; holladaysk@ornl.gov); Faith Ann Heinsch[2] (406-243-6218; faithann@ntsg.umt.edu); Jeffrey T. Morisette[3] (301-614-6676; jeff.morisette@gsfc.nasa.gov); Steven M. Margle[1] (865-241-5928; marglesm@ornl.gov); Steven W. Runnig[2] (406-243-6311; swr@ntsg.umt.edu)

[1]Oak Ridge National Laboratory, Environmental Sciences Division P.O. Box 2008, Oak Ridge, TN 37830, United States

[2]University of Montana, College of Forestry and Conservation, Missoula, MT 59812, United States

[3]NASA /Goddard Space Flight Center, Biospheric Sciences - Code 923, Greenbelt, MD 20771, United States

Data from multiple types of local and regional studies are needed to extrapolate from site studies to larger-scale products derived from remote sensing or global-scale modeling. This poster describes data compiled at the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC) to support the validation of MODIS land products. The ORNL DAAC provides data from several sources to support this effort: (1) a global network of flux tower sites (FLUXNET), (2) subsets of remote sensing products from MODIS, (3) ground-based studies designed to validate remote sensing products, and (4) regional and global data set of key environmental parameters. The FLUXNET database contains carbon, water vapor, sensible heat, momentum, and radiation flux measurements along with associated ancillary and value-added data products for a wide range of ecosystems on five continents. Subsets of selected MODIS products are provided in ASCII format for an area 7 x 7 km around each of 274 field sites. The MODIS products posted at the ORNL DAAC include surface temperature, reflectance, albedo, vegetation indices, land cover, leaf area index, photosynthetically active radiation, and photosynthesis. Data collected from land validation field studies are registered in the DAAC's Mercury metadata search and data retrieval system. Data on the global distribution of net primary production and leaf area index, based on 1000s of point measurements, are available from the ORNL DAAC for use in validation. Validation of MODIS Products has benefited from the use of core validation sites, where a suite of field, airborne, and satellite data is used to extrapolate from site studies to large-scale products. Existing in situ networks (e.g. flux towers, AERONET, LTER/ILTER) and field investigations (e.g., LBA, SAFARI 2000) as well as international partnerships and coordination, mainly through CEOS/IGOS, have been key components of the validation approach. We have learned that simplified data access with dedicated archives and easy-to-use data formats (e.g., ASCII subsets) as well as frequent communication between Product PIs, Validation PIs, and data facilitators all play a significant role in improving the understanding of the MODIS Land Products.

URL: http://www.daac.ornl.gov

B21E-0753 0830h POSTER

Remotely Sensed and In Situ Data Availability for Validation of EOS Land Data Products

John Dwyer[1] (605 594-6060; dwyer@usgs.gov)

Jeff Morisette[2] (301 614-6676; jeff.morisette@gsfc.nasa.gov)

[1]SAIC, USGS EROS Data Center, Sioux Falls, SD 57198, United States

[2]NASA, Goddard Space Flight Center, Greenbelt, MD 20771, United States

In support of the NASA Earth Observing System (EOS) Land Product Validation investigations, numerous remotely sensed data and field measurements are being collected at core validation sites around the world. These core sites' represent different biomes and include locations at which in situ measurements are routinely collected. The types of remotely sensed data that are being acquired and analyzed over these sites include Landsat 7 ETM+, ASTER, MODIS, and SPOT VEGETATION. The data being collected over these sites are being used to monitor ecosystem status, compile time-series records of biophysical and geophysical parameters, and to validate the suite of land products being derived from MODIS data. In order to facilitate easy access to the remotely sensed data being collected over these core sites, the data are stored online under FTP directories established by the Land Processes Distributed Active Archive Center (LP DAAC) at the USGS EROS Data Center. In situ measurements and data collected through field campaigns are being coordinated by the Oak Ridge National Laboratory Distributed Active Archive Center (ORNL DAAC) and being made accessible through the Mercury system, which is a web-based search engine (http://mercury.ornl.gov/ornldaac/). Access to many of the remotely sensed and in situ data sets collected over the EOS Land Validation core sites' can be accessed through Mercury or the MODIS Land Validation web page (http://modarch.gsfc.nasa.gov/MODIS/LAND/VAL/). We are hoping to stimulate interest and participation by the Validation of Land European Remote Sensing Instruments (VALERI, http://147.100.0.5/valeri//) to extend the network and diversity of sites as well as increase collaborative research. We have developed a web portal that enables investigators to select a particular site of interest, determine what data are available for that site, and select datasets for ftp download. Certain services may be requested to be applied to the data prior to download, including: spatial and parameter subsetting, projection transformation, and file format conversion. The scientific rationale for this project is predicated on improving international and interdisciplinary collaboration in the assessment, application, and improvement of remotely sensed data products and services available to the research community. Efforts to validate remotely sensed data products at a global scale are unprecedented, yet such efforts are necessary in order to quantify the errors or uncertainties associated with these derived geophysical and biophysical parameters. These products must be evaluated over a wide range of land surface conditions and on a regular basis.

B21E-0754 0830h POSTER

Obtaining and Using the MODIS Snow and Ice Products for Land Surface Research

Marilyn Kaminski[1] (1-303-735-5408; marilynk@nsidc.org); Siri Jodha Singh Khalsa[2] (sjsk@nsidc.org); Brad McLean[1] (btmclean@nsidc.org); Greg R Scharfen[1] (scharfen@nsidc.org); Jason Wolfe[1] (wolfe@nsidc.org); Dorothy K Hall[3] (dorothy.k.hall@nasa.gov)

[1]National Snow and Ice Data Center, University of Colorado UCB 449, Boulder, CO 80303, United States

[2]L-3 Communications Corporation, 1801 McCormick Drive Suite 170, Landover, MD 20774, United States

[3]Hydrological Sciences Branch, Code 974, NASA/Goddard Space Flight Center, Greenbelt, MD 20771, United States

Snow and sea ice cover are some of the more important spatial features of the Earth's surface that can be readily measured from space. Moderate Resolution Imaging Spectroradiometer (MODIS) instruments onboard NASA's Terra and Aqua spacecraft collect spectral data that are used to routinely produce snow cover and sea ice products. With higher spatial and spectral resolution, the MODIS snow and ice products (including snow albedo and sea ice surface temperature) improve upon a long history of global coverage satellite-derived products that have been produced from polar-orbiting satellites since the early 1970s. Fully automated, quality controlled, daily global maps of snow cover and sea ice extent, produced at 500m, 1000m, and 0.05° spatial resolutions by the MODIS Land Team, are available from the National Snow and Ice Data Center (NSIDC) Distributed Active Archive Center (DAAC). MODIS snow and ice products from the Terra satellite have been produced since 2000; most of these products have been validated over a wide range of locations and time periods. Production of comparable snow and ice products using Aqua data will begin during the next few months after final testing of an algorithm that uses a slightly different set of spectral bands. Recent work to improve the performance and utility of the products includes: subsetting, gridding, and resampling tools; an easy-access Data Pool of recent and popular data holdings; reduced-resolution browse data available through the ordering systems; and plans for new products including a snow albedo product as well as a sea ice product on a climate modeling grid. Through examples of current MODIS data usage, we describe the characteristics and state of validation of the MODIS snow and ice products, their accessibility from the NSIDC DAAC, and current user support and tools.

URL: http://nsidc.org/modis

B21E-0755 0830h POSTER

Biospheric Monitoring and Ecological Forecasting using EOS/MODIS data, ecosystem modeling, planning and scheduling technologies

Ramakrishna R Nemani[1] (406-243-4632; nemani@ntsg.umt.edu); Petr Votava[1] (votava@ntsg.umt.edu); Keith Golden[1] (kgolden@mail.arc.nasa.gov); Hirofumi Hashimoto[2] (hiro@ntsg.umt.edu); Matt Jolly[2] (mattj@ntsg.umt.edu); Michael White[3] (whitem@cc.usu.edu); Steve Running[2] (swr@ntsg.umt.edu); Joseph Coughlan[1] (joseph.c.coughlan@nasa.gov)

[1]NASA Ames Research Center, Mail Stop: 242-4, Moffett Field, CA 94035, United States

[2]NTSG/University of Montana, Science Complex, 428, Missoula, MT 59801, United States

[3]Utah State University, Dept. of Aquatic, Watershed and Earth Resources, Logan, UT 84322, United States

The latest generation of NASA Earth Observing System satellites has brought a new dimension to continuous monitoring of the living part of the Earth System, the Biosphere. EOS data can now provide weekly global measures of vegetation productivity and ocean chlorophyll, and many related biophysical factors such as land cover changes or snowmelt rates. However, information with the highest economic value would be forecasting impending conditions of the biosphere that would allow advanced decision-making to mitigate dangers, or exploit positive trends. We have developed a software system called the Terrestrial Observation and Prediction System (TOPS) to facilitate rapid analysis of ecosystem states/functions by integrating EOS data with ecosystem models, surface weather observations and weather/climate forecasts. Land products

from MODIS (Moderate Resolution Imaging Spectroradiometer) including land cover, albedo, snow, surface temperature, leaf area index are ingested into TOPS for parameterization of models and for verifying model outputs such as snow cover and vegetation phenology. TOPS is programmed to gather data from observing networks such as USDA soil moisture, AMERIFLUX, SNOWTEL to further enhance model predictions. Key technologies enabling TOPS implementation include the ability to understand and process heterogeneous-distributed data sets, automated planning and execution of ecosystem models, causation analysis for understanding model outputs. Current TOPS implementations at local (vineyard) to global scales (global net primary production) can be found at http://www.ntsg.umt.edu/tops.

B21E-0756 0830h POSTER

Observation And Illumination Effects in MODIS Land Surface Temperature

Mohan L. Nirala[1] (301-614-6677; mnirala@ltpmail.gsfc.nasa.gov)

Jeffrey L. Privette[2] (Jeffrey L. Privette@nasa.gov)

Ana C.T. Pinheiro[3] (ana@pengimms.gsfc.nasa.gov)

[1]University of Maryland Baltimore County and NASA's GSFC, Greenbelt Road, Greenbelt, MD 20771

[2]Biospheric Sciences Branch, NASA's GSFC, Greenbelt Road, Greenbelt, MD 20771

[3]New University of Lisbon (Portugal) and NASA' GSFC, Greenbelt Road, Greenbelt, MD 20771

Land surface temperature (LST) estimation is important for various applications in such as estimating land-atmosphere fluxes, soil moisture, and water stress and droughts. Remote sensing is only technique which can provide consistent global LST data on a frequent basis. However, recent studies with afternoon AVHRR data have shown that LST data are vulnerable to large systematic biases as a result of sensor and sun geometry effects. These biases vary with vegetation structure, but seem most prevalent in woodland and savannas. In this investigation, we studied the angular effects on the morning-pass MODIS LST products. We have conducted both continental and point case studies over Africa using both 1 km and 5 km resolution data. Our methods rely on detailed correlative and modeling analysis of LST with sun-view geometry and unique vegetation structural maps, including fractional crown cover, crown height and width, and understory occurrence. We report the seasonal and spatial variability of LST over Africa and suggest implications as well as possible remedies.

B21E-0757 0830h POSTER

Near Real Time Land Surface Temperature in the MODIS Rapid Response System

Ana C.T. Pinheiro[1] (301-614-6696; ana@fado.gsfc.nasa.gov)

Jacques Descloitres[1] (301-614-5456; jack@ltpmail.gsfc.nasa.gov)

Jeffrey L. Privette[2] (301-614-6630; jeff.privette@nasa.gov)

[1]Science Systems and Applications Inc., Greenbelt Road, Lanham, MD 20706, United States

[2]NASA's Goddard Space Flight Center, Greenbelt Road, Greenbelt, MD 20771, United States

The MODIS Rapid Response System was developed to expedite availability of select MODLAND products for online distribution within hours after satellite overpass. To date, this system has produced the active fire product and imagery for selectable locations worldwide. This has primarily served wildfire fighting and community outreach purposes. Recently, we adapted the MODLAND Land Surface Temperature Product for using in the Rapid Response System. This required several modifications to the code since other input products (e.g., atmosphere water vapor) are not immediately available after satellite overpass. We now use forecasted atmospheric parameters as well as TOVS climatology to produce the near real time LST. We compare and characterize differences between the standard operational MODIS LST product and the new Rapid Response Product. The near real time LST was designed for agricultural and water stress monitoring as well as hydrological assimilation modeling. We indicate lessons learned and suggest future improvements.

B21E-0758 0830h POSTER

Validation of the MODIS Land-Surface Temperature Products with Temperature and Radiance-based Methods

Zhengming Wan[1] (1-805-893-4541; wan@icess.ucsb.edu)

Yulin Zhang[1] (zhang@icess.ucsb.edu)

Qincheng Zhang[1] (qzhang@icess.ucsb.edu)

[1]University of California, ICESS, Santa Barbara, CA 93106-3060, United States

A major field campaign was conducted in Railroad Valley, NV, in June 2003. Ground-based measurements were made in the clear-sky days from June 26 to 30. Sky radiance and surface-leaving TIR radiance in sunshine and shadow conditions were measured with a Bomem TIR spectroradiometer. Diurnal surface temperatures were measured with four TIR radiometers. Six radio sounding balloons were launched in the period of clear-sky days to measure the atmospheric temperature and water vapor profiles. MODIS Airborne Simulator (MAS) data were acquired in a daytime flight and a nighttime flight on June 27. An excellent match between the measured spectral sky radiance and the radiance calculated with atmospheric radiative transfer code MODTRAN4.0 based on the measured atmospheric profiles provides a solid evidence of the good quality of both the TIR spectroradiometer and the radiative transfer code. The measured surface-leaving TIR radiance in sunshine and shadow conditions were used to retrieve playa surface spectral emissivity by a sun-shadow method. The band-averaged emissivities calculated from the retrieved spectral emissivity agree within 0.005 with those used in the MODIS split-window LST algorithm for the site. Terra and Aqua MODIS 1km LST products were validated with a temperature-based method using the LSTs measured by the TIR radiometers at nights. This method is limited by the spatial variation in LSTs, which is obviously shown in the day and night MAS images. The LST products were also validated in day and night conditions with a radiance-based method, which is based on the MODTRAN code, measured surface emissivity and atmospheric profiles. The LST accuracies are better than 1K in all seven Aqua cases where zenith viewing angles are up to 56°, and in four of six Terra cases. The LST accuracy is better than 1.5K in the remaining two Terra cases with viewing angles at 54°and 60°. The accuracy of nighttime LSTs at viewing angles within 47°is better than 0.5K in four Aqua cases and two Terra cases. The MODIS LST products have been validated, most within 1K, in more than 40 clear-sky cases in the wide ranges of surface temperature and atmospheric conditions in 2000-2003.

B21E-0759 0830h POSTER

Land-Use Change: Impacts of Climate Variations and Policies Examples From Northern Shaanxi Province, China

Madelene Ostwald (617-452 5991; ostwald@mit.edu)

Massachusetts Institute of Technology, Earth, Atmospheric and Planetary Sciences 54-1411, 77 Massachusetts Avenue, Cambridge, MA 02139, United States

Phases of dynamical change are taking place in many developing countries causing land-use change. In China there has been enormous economic growth since 1978 followed by impacts on the environmental, social and economical conduct of the society. One of the counter actions taken by the Government to halt the environmental degradation in the Loess Plateau has been the introduction of the Crop Conversion Program in 1999, stopping agricultural activity in slope areas, mainly used by small-scale farmers. At the same time climate variations have also been evident in the area with decreases in rainfall and increases in temperature since 1970. The aim here is to examine what vegetation changes are seen on large scales in the area from 2000-2002, and how they correlate to local land-use changes. We then investigate how the land-use changes correlated with climate variations and/or policies and reforms. The data included in this integrated assessment includes remote sensing information from MODIS and ASTER images, climate and statistical data as well as farmer's participatory data. The results show that the large-scale vegetation has increased and that correlates well with dramatic local land-use change caused by the policy implementation. This however is not correlated with the climate variation found during this time (both lagged and simultaneous) which show a less favorable vegetation condition; all very well perceived by farmers. Hence the direct force behind the extreme land-use change is more associated with policy and economics than climate

B21E-0760 0830h POSTER

A Vegetation Classification of the Opunohu Valley (Moorea Island, French Polynesia) based on a Relative Canopy-Height Class Set Using AirSAR and MASTER Data.

Benoit Stoll[1] (689-803-939; stoll@upf.pf)

Johann Thomas[2] (thomas@ensg.ign.fr)

Patrick Capolsini[1] (689-803-878; capolsin@upf.pf)

[1]Laboratoire JETO, Université de Polynésie Française,, BP6570, Faa'a-TAHITI 98702, French Polynesia

[2]ENSG-IGN, Cité Descartes, 6-8 avenue Blaise Pascal, Champs-sur-Marne, MARNE-LA-VALLEE 77455, France

This paper addresses the vegetation mapping and land use of Opunohu Valley (Moorea Island - French Polynesia) using JPL-AirSAR and MASTER (MODIS/ASTER simulator) images acquired during the PACRIM2 mission (Aug. 2000). These sensors are different but can be considered as complementary since MASTER is a 20 meters ground resolution multispectral imaging scanner with 50 channels distributed in the visible-shortwave infrared, mid infrared and thermal infrared, and AirSAR is a C-band (TOPSAR) and L-band (POLSAR), 5meters ground resolution radar sensor. Our main application field deals with the complex and fragile vegetation cover of south pacific volcanic islands. We presently focus on Opunohu Valley because of its highly representative diversity of vegetation and land cover (found in other polynesian volcanic islands), including different types of forests, coconut fields, grass fields, fern lands, urban zones, agricultural areas, etc... We first defined an original set of classes based on the relative canopy-height of vegetation, we then composed a well-suited RGB SAR-composite image in order to visually discriminate our vegetation classes. An interesting "pineapple fields" class (an important economic resource in Moorea island) proved to particularly discriminate from height-related "grass fields" class because of its structural properties, which lead to a particular signature on SAR images. Using a supervised maximum likelihood algorithm, two classification maps have been defined on both the AirSAR and the MASTER images, using aerial photographs as a ground truth training set. The vegetal species included in each class as well as the classification results are further discussed and the MASTER and AirSAR based classification maps are compared.

B21E-0761 0830h POSTER

Using remote sensing to estimate global impounded water in small artificial reservoirs

Betsy Blaisdell[1,2] (betsyblaisdell@hotmail.com)

Dork Sahagian[1,2] (dork.sahagian@unh.edu)

Xiangming Xiao[2] (xiangming.xiao@unh.edu)

Rob Braswell[2] (rob.braswell@unh.edu)

[1]Earth Sci., University of New Hampshire, Durham, NH 03824

[2]EOS, University of New Hapmshire, Durham, NH 03824

The impoundment of water has served to increase global water resources through time in support primarily of growing agricultural needs. If future capabilities or policies retard the increase in water impoundment, then there will be an impact on agricultural productivity that may not be accounted for in current projections. Thus, it would be desirable to determine the total amount and rate of water impounded to date in order to better estimate the effects on usable water resources and global sea level. Dams have been built for many years, but only the large, registered reservoirs are counted in international tallies of impounded water resources. To date there is not even a rough estimate of the amount stored in the literally millions of small reservoirs such as farm ponds and rice paddies that have resulted from small scale agricultural and other land use. The volumes of these cumulatively may exceed that of the few large reservoirs. Further, there has been no estimate at all of the amount of ground water impounded by any dams, large or small. While it is impractical to inventory millions of small agricultural impoundments, it is possible to use remote sensing data to estimate the quantity of this impounded water so that more accurate projections of water resource availability as well as 21st century sea level rise can be made. One approach to this problem is based on hydrologic land use regimes globally. Hydrologic land use characterization would involve determining the amount of water impounded for agriculture locally using Landsat data along with ground-based information, and extending to the global scale using MODIS data. Comparison with climate data will make it possible to estimate the

area of irrigated land using mid-infrared and optical bands. Based on this information one can calculate the global areal extent of agricultural land irrigated from impounded water resources. A second approach involves unmixing MODIS data for sub-pixel analysis of small water bodies directly. The MODIS analysis can be "trained" by high-resolution analysis of Landsat TM data, leading to global impounded reservoir area from MODIS without the need for hydrologic land use characterization. In both approaches, water volume can be determined by impounded water area inferred from remote sensing, and typical water depths obtained from local studies. For all reservoirs (big and small) impounded ground water can be estimated using topographic databases, combined with information regarding typical porosities and dam height. Integrating this information with impounded surface water, total increases in water resources can be determined.

B21E-0762 0830h POSTER

Inter-comparison of MODIS and AVHRR NDVI Time Series for Monitoring Terrestrial Vegetation

Brad Reed[1] (605-594-6012; reed@usgs.gov)

John Dwyer[1] (605-594-6060; dwyer@usgs.gov)

[1]SAIC, USGS EROS Data Center, Sioux Falls, SD 57198, United States

The moderate resolution imaging spectroradiometer (MODIS) is NASA's primary Earth observation sensor for global change studies. With the launch of the Terra satellite in 1999 and Aqua in 2002, improved data for land studies of radiation budget, ecosystems, and land cover characteristics, as well as ocean and atmospheric data, became available to scientists. One ecosystem variable that has been extensively used for remote sensing studies of global change is the normalized difference vegetation index (NDVI), a greenness measure that is linearly related to several biophysical measures such as fraction of photosynthetically active radiation (fPAR) and leaf area index (LAI). The value of the NDVI is that it has been calculated for many years from a heritage satellite sensor, the advanced very high resolution radiometer (AVHRR), thus establishing a useful time-series of global change related data. However, due to several differences between MODIS and AVHRR, including sensor radiometery, spectral resolution, and overpass time, direct comparisons and transitions are not readily made. This poster describes a dataset that has been created by the US Geological Survey to facilitate such comparisons and to document and characterize the similarities and differences between the sensors. Early results indicate similar temporal trajectories of the two time-series, but the NDVI from MODIS has generally slightly higher values than that from AVHRR. This indicates that temporal studies between the sensors may not require extensive corrections, but studies concerned with the magnitude of the NDVI will require considerable adjustment. In addition, several metrics derived from the NDVI temporal trajectories may be used to describe and associate the phenologic state of vegetation within the context of regional climatic influences.

B21E-0763 0830h POSTER

Albedo/BRDF Retrievals from MODIS Using 8-day Clear-sky Composites

Yi Luo[1] ((613) 992-8796; yi.luo@NRCan.gc.ca)

Alexander P Trishchenko[2] ((613) 995-5787; Trichtch@nrcan.gc.ca)

Rasim Latifovic[2] (613) 947-1816; Rasim.Latifovic@nrcan.gc.ca)

Zhanqing Li[3] ((301) 405-6699; zli@atmos.umd.edu)

[1]Noetix Research Inc., 265 Carling Ave, Ottawa, ON K1S2E1, Canada

[2]Canada Centre for Remote Sensing, NRCan, 588 Booth Street, Ottawa, ON K1A0Y7, Canada

[3]University of Maryland, 2207 Computer & Space Sciences Bldg, College Park, MD 20742-2425, United States

We present results of retrievals of surface bidirectional reflectance distribution function (BRDF) and albedo properties using MODIS 8-day clear-sky composite product MOD09. The approach is based on simultaneous use of landcover classification and clear-sky composite data products. Surface anisotropic properties derived from MODIS, which is a cross track scanning instrument, are also validated against multiangular observations available from Terra/MISR data. Comparison has been made over the Atmospheric Radiation Measurement (ARM) Program Southern Great Plane (SGP) study area. In general, results compare quite favorably with MODIS BRDF/Albedo product MOD43. This indicates the possibility of surface albedo/BRDF mapping with higher temporal resolution - 8 days instead of 16 days as presently adopted in MODIS data processing. Limitations and consequences of BRDF retrievals using observations available from single sun-synchronous platform are also analyzed. Approach and results for generating 10-day surface albedo/BRDF products using MODIS MOD09 clear-sky composite data will be also discussed. This temporal resolution is required to provide compatibility with other satellite datasets, such as ones available from AVHRR and VGT sensors. This research was supported by the US Department of Energy Atmospheric Radiation Measurement (ARM) Program under grant No. DE-FG02-02ER63351.

B21E-0764 0830h POSTER

New Features of the Collection 4 MODIS LAI and FPAR Product

Tan Bin[1] (+1 617 353 8845; tanbin@crsa.bu.edu); Wenze Yang[1] (+1 617 353 8846; ywze@crsa.bu.edu); Huang Dong[1] (+1 617 353 8846; dh@crsa.bu.edu); Nikolay Shabanov[1] (+1 617 353 5985; shabanov@crsa.bu.edu); Yuri Knyazikhin[1] (jknjazi@crsa.bu.edu); Ranga Myneni[1] (+1 617 353 5742; rmyneni@crsa,bu.edu)

[1]Boston University, 675 Commonwealth Ave., #457, Boston, MA 02215, United States

An algorithm based on physics of radiative transfer in vegetation canopies for the retrieval of vegetation green leaf area index (LAI) and fraction of absorbed photosynthetically active radiation (FPAR) from MODIS surface reflectance data was developed, prototyped and is in operational production at NASA computing facilities since June 2000. This poster highlights recent changes in the operational MODIS LAI and FPAR algorithm introduced for collection 4 data reprocessing. The changes to the algorithm are targeted to improve agreement of retrieved LAI and FPAR with corresponding field measurements, improve consistency of Quality Control (QC) definitions and miscellaneous bug fixes as summarized below. * Improvement of LUTs for the main and back-up algorithms for biomes 1 and 3. Benefits: a) increase in quality of retrievals; b) non-physical peaks in the global LAI distribution have been removed; c) improved agreement with field measurements * Improved QA scheme. Benefits: a) consistency between MODLAND and SCF quality flags has been achieved; b)ambiguity in QA has been resolved * New 8-day compositing scheme. Benefits: a) compositing over best quality retrievals, instead of all retrievals; b) lowers LAI values, decreases saturation and number of pixels generated by the back-up * At-launch static IGBP land cover, input to the LAI/FPAR algorithm, was replaced with the MODIS land cover map. Benefits: a) crosswalking of 17 classes IGBP scheme to 6-biome LC has been eliminated; b) uncertainties in the MODIS LAI/FPAR product due to uncertainties in land cover map have been reduced

B21E-0765 0830h POSTER

Validation of prototype MODIS evapotranspiration (MOD16) in the eastern Asia

Kenlo Nishida (kenlo@sakura.cc.tsukuba.ac.jp)

Institute of Agricultural and Forest Engineering, University of Tsukuba, Japan 305-8572, Tsukuba 305-8572, Japan

The prototype MODIS evapotranspiration (ET) algorithm was tested with ground flux observation network. As a result, the algorithm based on a two-source model and the complementary concept gave almost same accuracy as initially obtained in the north American region on NOAA/AVHRR.

B21E-0766 0830h POSTER

Application of MODIS GPP to Forecast Risk of Hantavirus Pulmonary Syndrome Based on Fluctuations in Reservoir Population Density

Rachel Loehman[1] ((406) 243-5616; rachel@ntsg.umt.edu)

Faith Ann Heinsch[1] ((406) 243-6218; faithann@ntsg.umt.edu)

James N. Mills[2] ((404) 639-1510; jmills@cdc.gov)

Kent Wagoner[2] ((404) 639-1510; kew7@cdc.gov)

Steve Running[1] ((406) 243-6311)

[1]NTSG, College of Forestry and Conservation, University of Montana, Missoula, MT 59812, United States

[2]Special Pathogens Branch, Division of Viral and Rickettsial Diseases, Centers for Disease Control and Prevention, Atlanta, GA 30333, United States

Recent predictive models for hantavirus pulmonary syndrome (HPS) have used remotely sensed spectral reflectance data to characterize risk areas with limited success. We present an alternative method using gross primary production (GPP) from the MODIS sensor to estimate the effects of biomass accumulation on population density of *Peromyscus maniculatus* (deer mouse), the principal reservoir species for Sin Nombre virus (SNV). The majority of diagnosed HPS cases in North America are attributed to SNV, which is transmitted to humans through inhalation of excretions and secretions from infected rodents. A logistic model framework is used to evaluate MODIS GPP, temperature, and precipitation as predictors of *P. maniculatus* density at established trapping sites across the western United States. Rodent populations are estimated using monthly minimum number alive (MNA) data for 2000 through 2002. Both local meteorological data from nearby weather stations and 1.25 degree x 1 degree gridded data from the NASA DAO were used in the regression model to determine the spatial sensitivity of the response. MODIS eight-day GPP data (1-km resolution) were acquired and binned to monthly average and monthly sum GPP for 3km x 3km grids surrounding each rodent trapping site. The use of MODIS GPP to forecast HPS risk may result in a marked improvement over past reflectance-based risk area characterizations. The MODIS GPP product provides a vegetation dynamics estimate that is unique to disease models, and targets the fundamental ecological processes responsible for increased rodent density and amplified disease risk.

B21E-0767 0830h POSTER

Current Status Of MOD17 And What Influence Its Results

Maosheng Zhao[1] (zhao@ntsg.umt.edu)

Steven W. Running[1] (swr@ntsg.umt.edu)

Ramakrishna R. Nemani[1] (nemani@ntsg.umt.edu)

[1]NTSG, College of Forestry and Conservation, University of Montana, Missoula, MT 59812, United States

With the validation of collection3 MODIS data for 2001 and 2002, EOS science team is improving some MODIS algorithms and related ancillary data sets to enhance the accuracy of MODIS products. Now collection4 MODIS data sets are being reprocessed. Here we compare MOD17 collection4 with collection3 globally to see which aspects are improved and what make this happen. Changes in daily meteorological data (DAO) inputs and MOD15A2 (8-day Fpar & LAI) have great impacts on MOD17 results. Globally, latest GEOS4.02 DAO data sets have higher accuracy than previous GEO3.0, which contributes much to MOD17 improvements. Improved MOD15A2 plays an important role in MOD17 improvements for some biomes, such as grass and crop. Furthermore, we find some uncertainties in MOD17, and propose some schemes for future improvements. For example, 1) the DAO boundary lines existing in MOD17 image due to its coarse spatial resolution can be eliminated by spatial non-linear interpolation, 2) the short missing-period and cloud contaminated pixels can be filled by using temporal linear interpolation, 3) unrealistic negative NPP can be solved by using a relatively constant ratio of NPP to GPP. In the end, the improved MOD17 can enhance our abilities to monitor ecological conditions, natural resources, and environment changes.

URL: http://www.ntsg.umt.edu

B21F MCC: Level 2 Tuesday 0830h

The Impact of Dust Emission and Deposition on Biogeochemical Cycling and Ecosystem Function I Posters

(joint with A, H, OS, PP)

Presiding: **G S Okin,** University of Virginia**; N Mahowald,** National Center for Atmospheric Research

B21F-0768 0830h POSTER

Estimate of Nutrient Input to the Pacific Ocean from Long-Range Transport of Aerosols

Steven S Cliff[1] ((530)867-2037; sscliff@ucdavis.edu)

Tony VanCuren[2] ((916)327-1511; rvancure@arb.ca.gov)

[1]Universisty of California, Davis, Department of Applied Science One Shields Avenue, Davis, CA 95616, United States