

# **An Overview of MODIS Land Science Products**

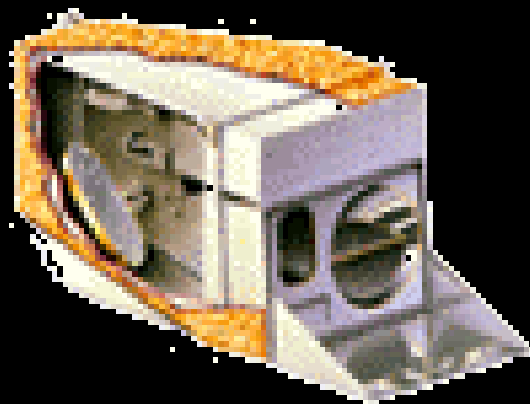
**Alan Strahler, Boston University**

**CSIRO—Land and Water**

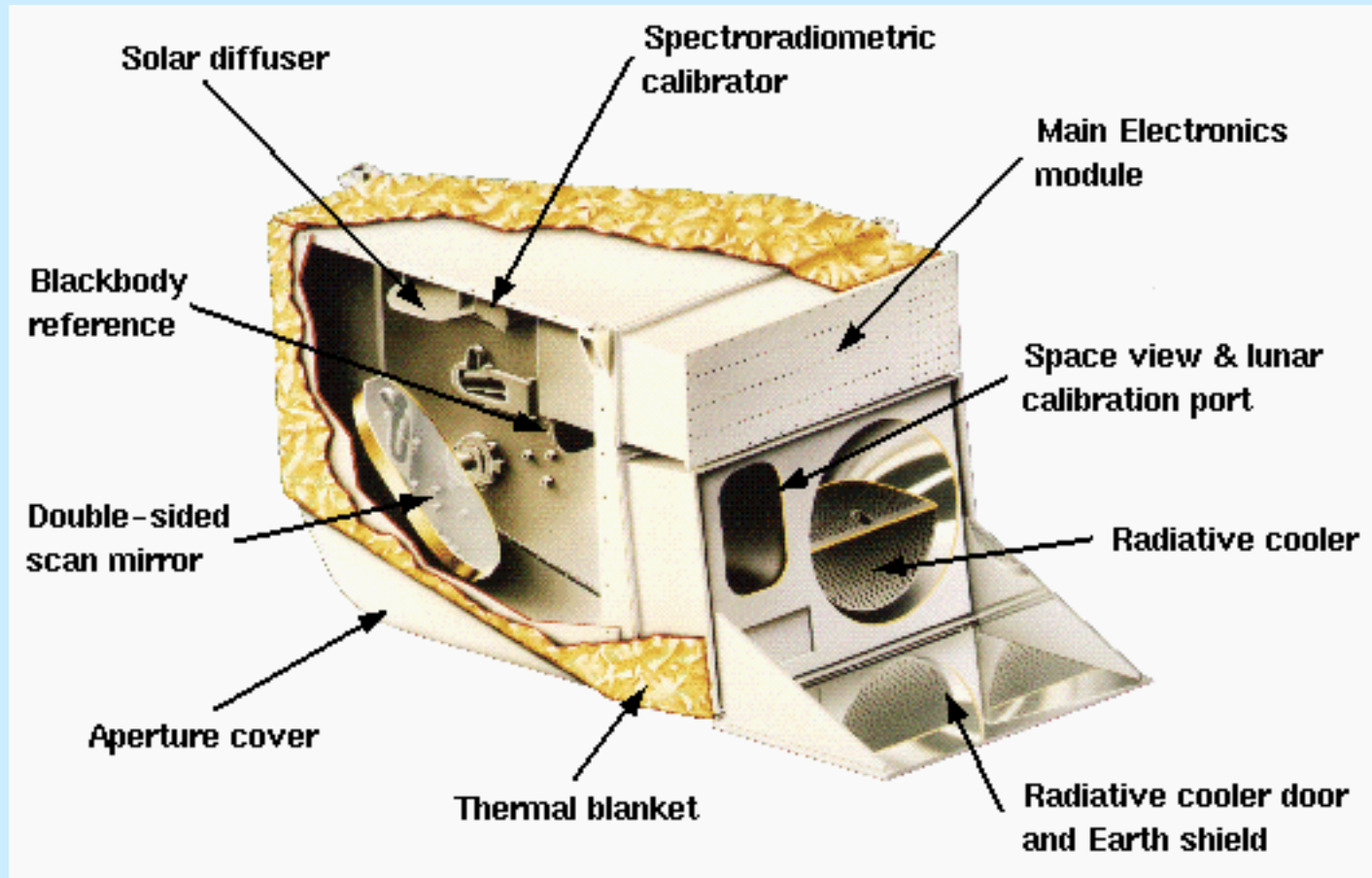
**14 October 2003**

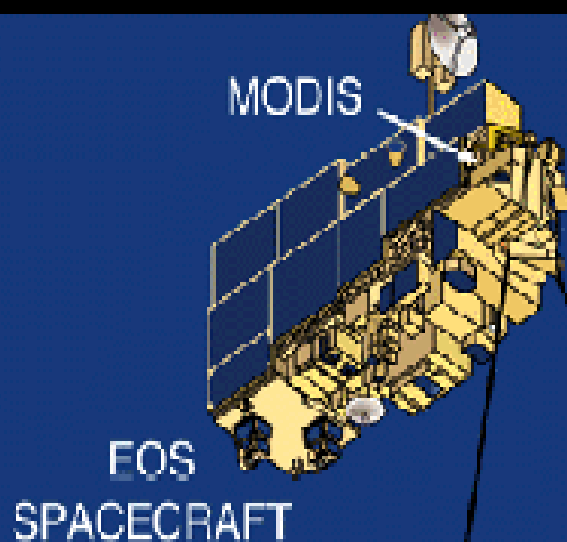
# MODIS

- **Moderate-Resolution Imaging Spectroradiometer**
- **36 spectral bands (0.4–14  $\mu\text{m}$ ), 7 for land imaging**
- **250-m and 500-m spatial resolution for land studies**
- **Launched December 18, 1999, on NASA's *Terra* satellite platform**

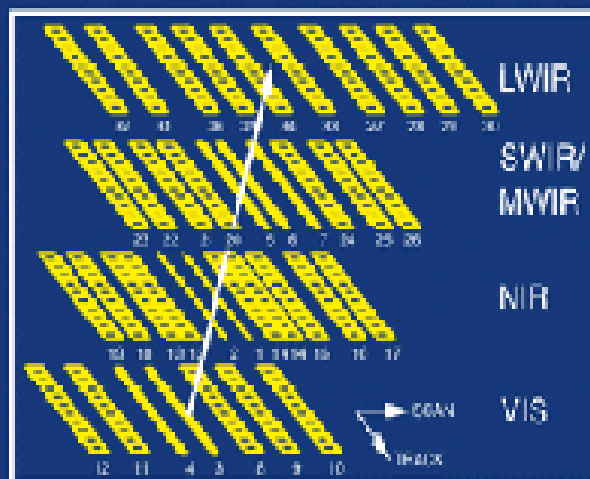


# MODerate-resolution Imaging Spectrometer (MODIS)





# FOUR COREGISTERED FPAs



NIGHT

DAY



L459.004



# MODIS Land Bands

<i>Band number</i>	<i>Spatial resolution</i>	<i>Wavelength, nm</i>	<i>Waveband region</i>
<i>1</i>	<i>250 m</i>	<i>620-670</i>	<i>Red</i>
<i>2</i>	<i>250 m</i>	<i>841-876</i>	<i>Near-infrared</i>
<i>3</i>	<i>500 m</i>	<i>459-479</i>	<i>Blue</i>
<i>4</i>	<i>500 m</i>	<i>545-565</i>	<i>Green</i>
<i>5</i>	<i>500 m</i>	<i>1230-1250</i>	<i>Near-infrared</i>
<i>6</i>	<i>500 m</i>	<i>1628-1652</i>	<i>Shortwave infrared</i>
<i>7</i>	<i>500 m</i>	<i>2105-2135</i>	<i>Shortwave infrared</i>

# Terra Launch on December 18, 1999





# Aqua MODIS Orbital Swath



Daily MODIS Coverage  
True-color browse image



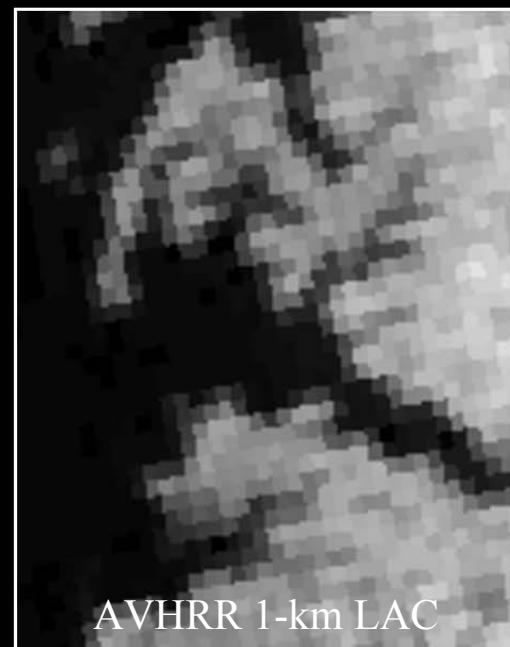
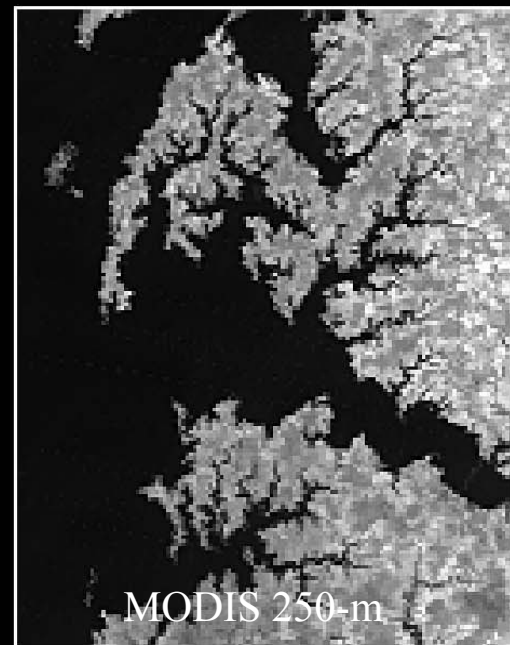
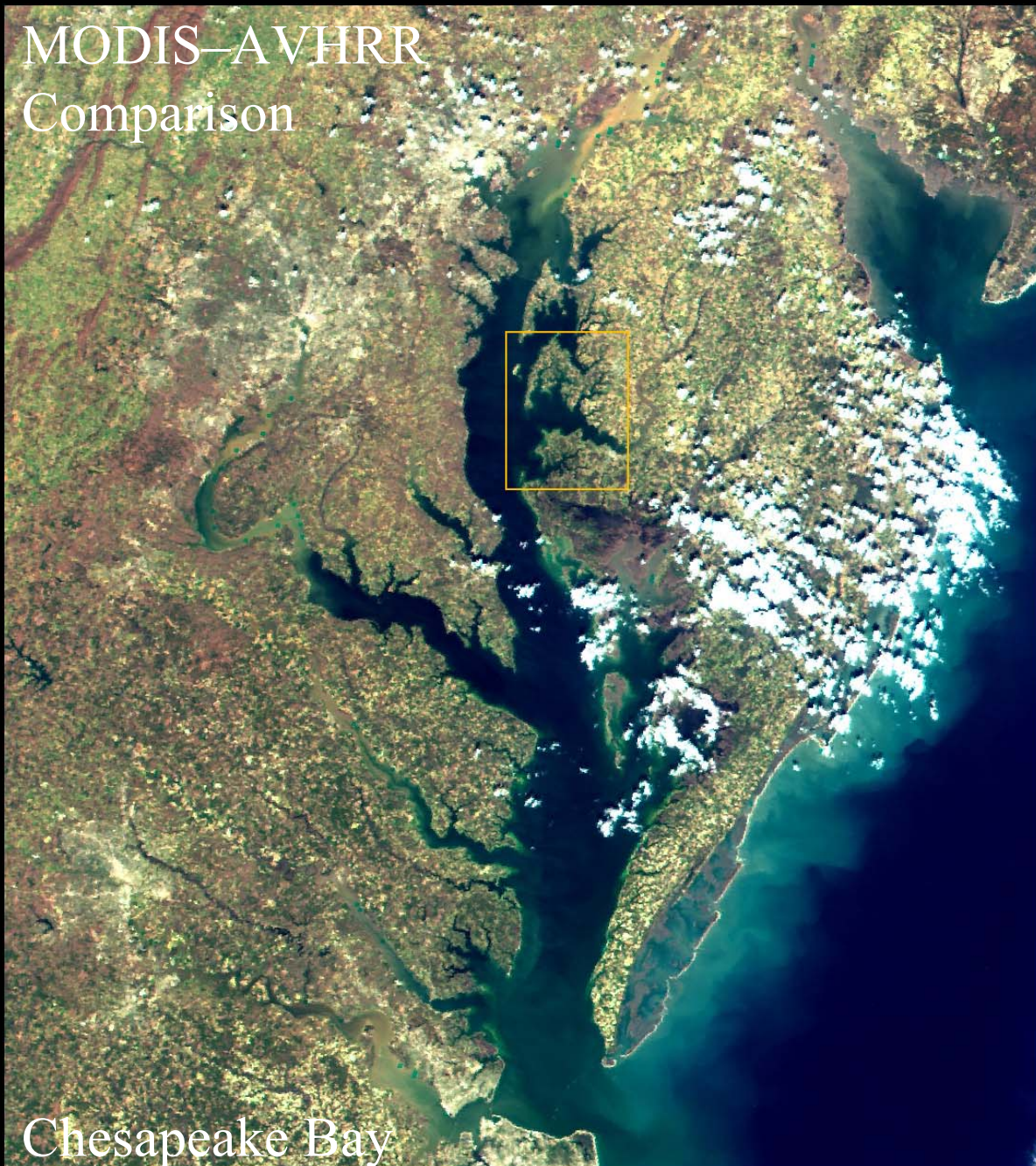
East Coast Zoom  
March 3 2000

MODIS  
True color





# MODIS-AVHRR Comparison





Boston, Cape Cod,  
And the Islands  
March 8 2000





# Baja California

## May 5 2000





Nile Valley  
February 28 2000



# MODIS Land Products / ESE Research Themes

- ***Energy Balance Product Suite***

- Surface Reflectance
- BRDF/Albedo
- Land Surface Temperature
- Snow Cover

**Global Water Cycle and Energy Balance**

- ***Vegetation Parameters Suite***

- Vegetation Indices
- LAI/FPAR
- NPP/PSN

**Biology and Biogeochemistry of Ecosystems and the Global Carbon Cycle**

- ***Land Cover/Land Use Suite***

- Land Cover/Vegetation Dynamics
- Vegetation Continuous Fields
- Vegetation Cover Change
- Fire and Burned Area

**Land Cover and Land Use Change**

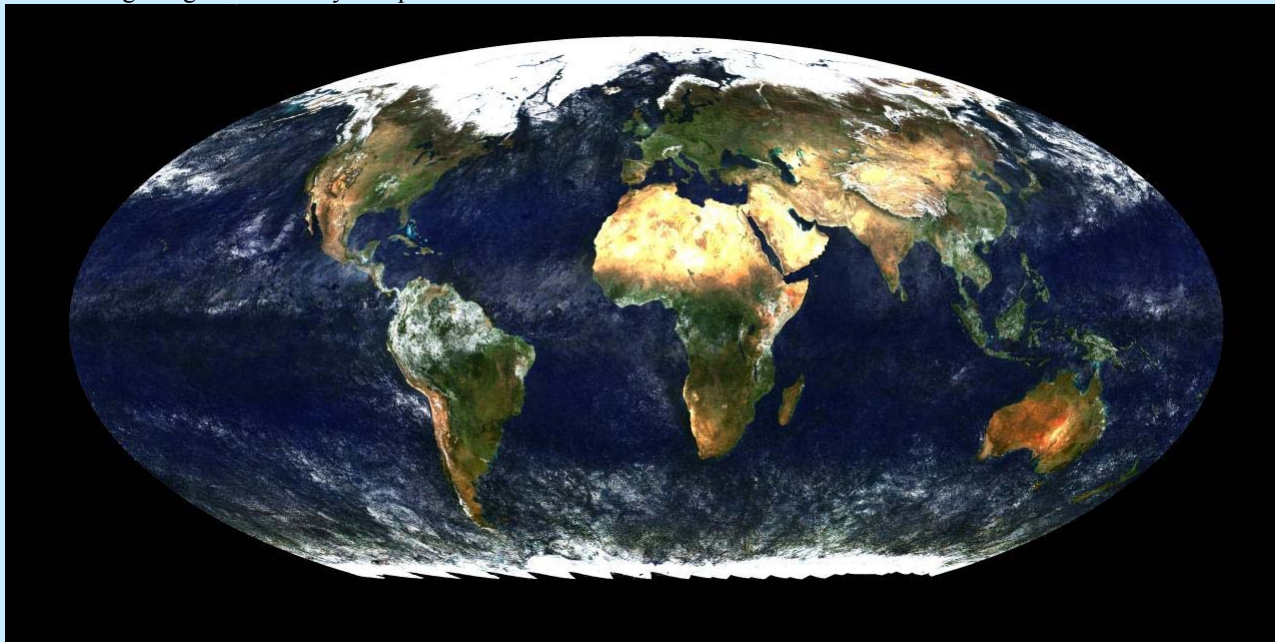
**Atmospheric Chemistry and Aerosols**

# MODIS Product Suites

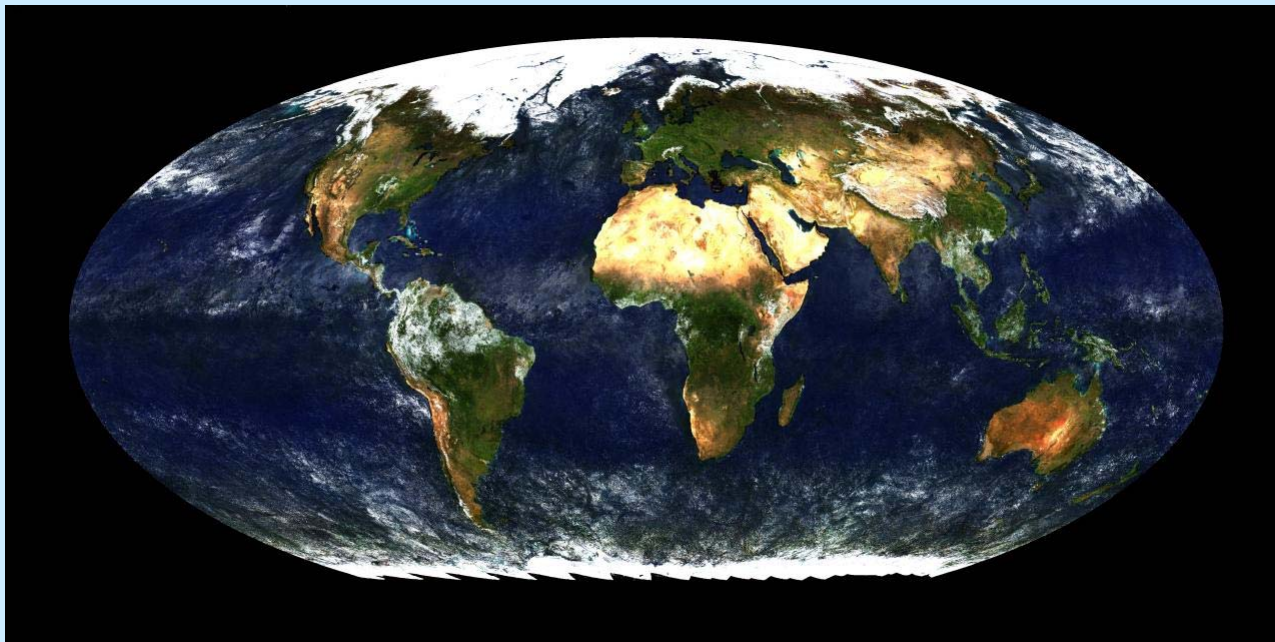
- *Energy Balance Product Suite*
  - Surface Reflectance
  - BRDF/Albedo
  - Land Surface Temperature
  - Snow Cover
- *Vegetation Parameters Suite*
  - Vegetation Indices
  - LAI/FPAR
  - NPP/PSN
- *Land Cover/Land Use Suite*
  - Land Cover/Vegetation Dynamics
  - Vegetation Continuous Fields
  - Vegetation Cover Change
  - Fire and Burned Area



RGB image of global monthly composite surface reflectance not corrected for aerosol effect.



RGB image of global monthly composite surface reflectance corrected for aerosol effect.

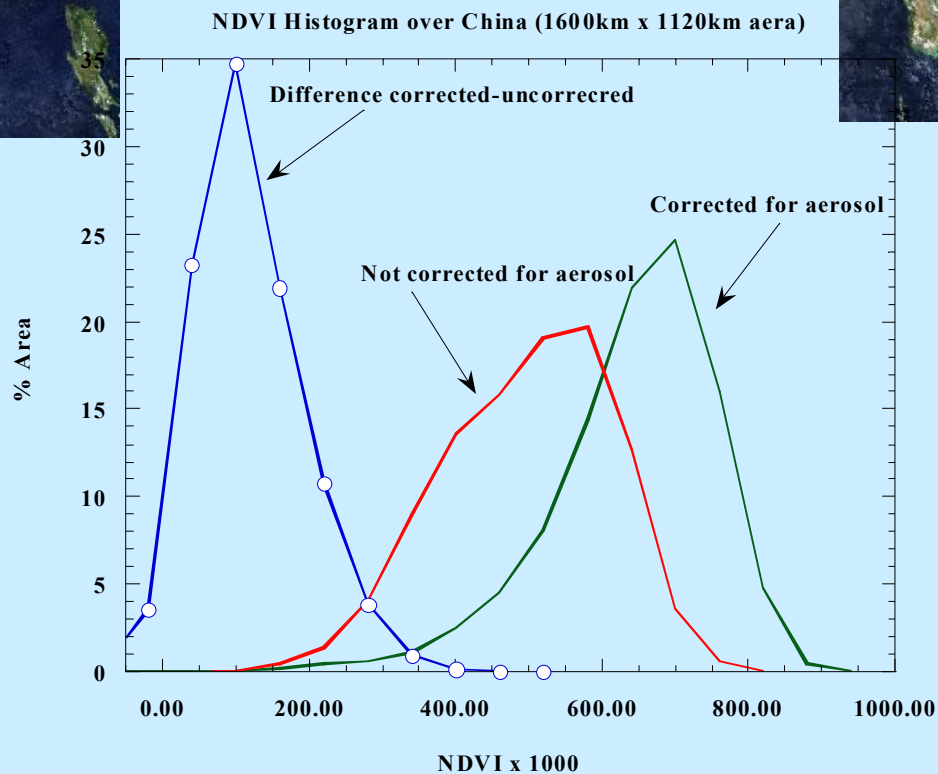


# *Prototype correction details over China*

## No aerosol correction



## Aerosol correction

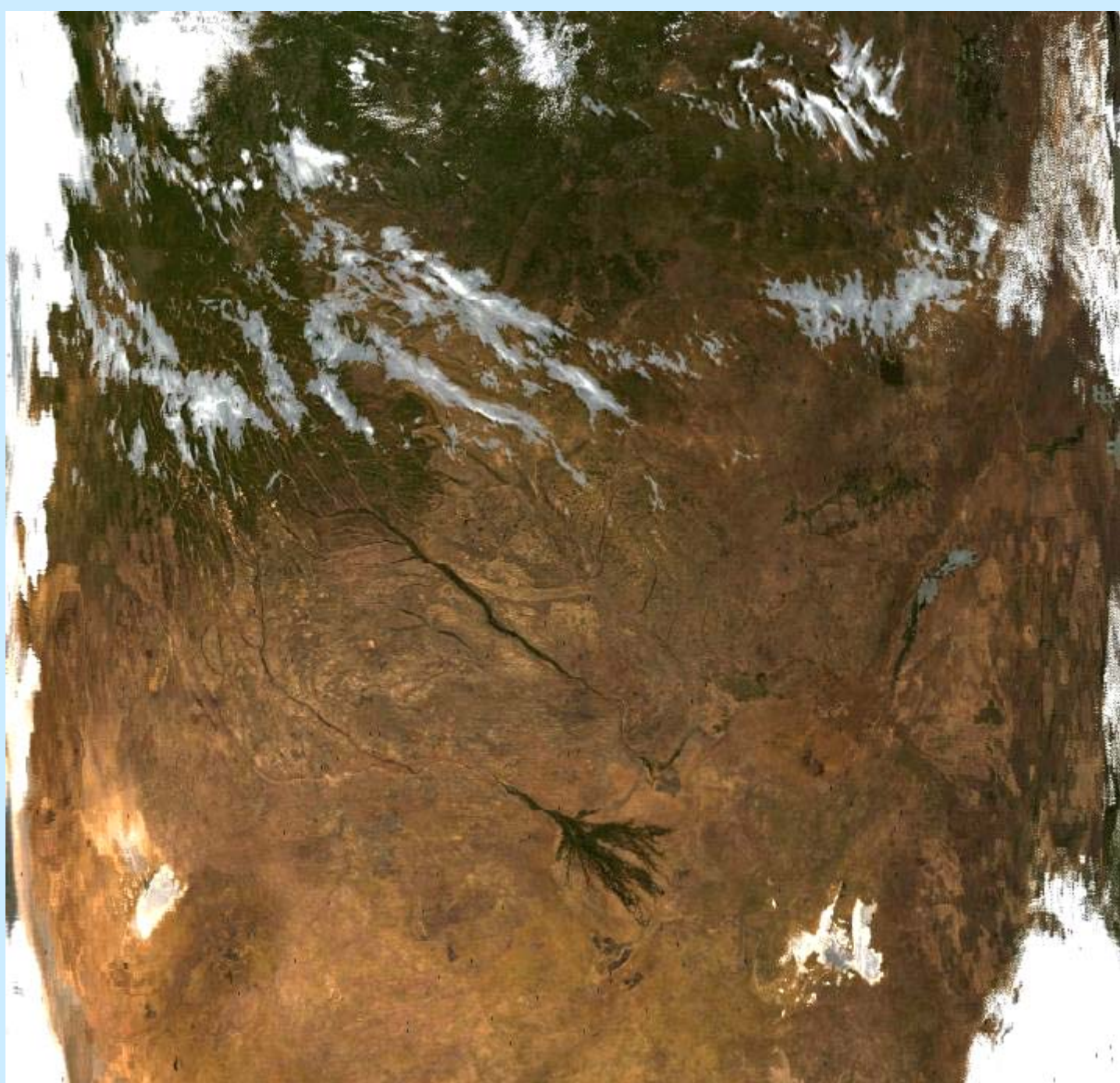




Southern Africa  
surface  
reflectance -  
not corrected  
for aerosols



Southern Africa  
corrected  
for aerosol



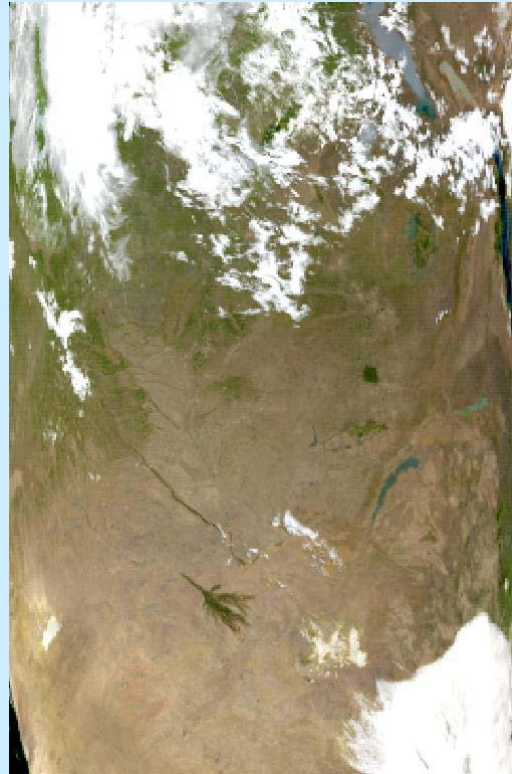


*The surface reflectance algorithm uses internal 1km aerosol optical depth since collection 3 processing.*

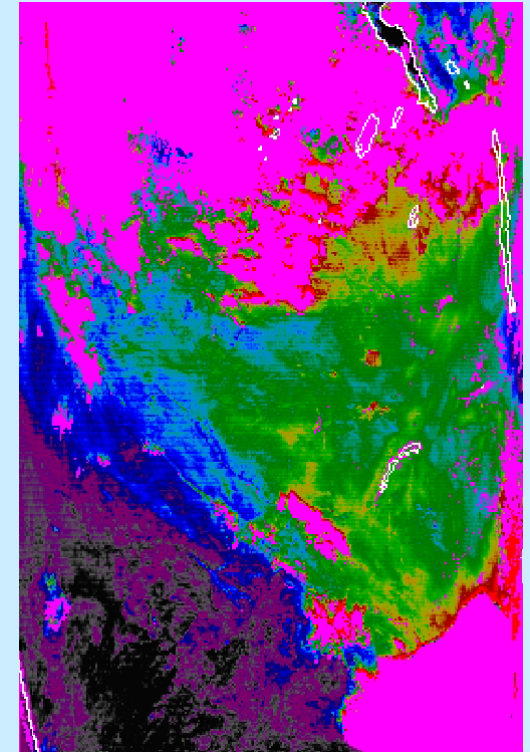
MODIS Granule over South Africa (Sept,13,2001, 8:45 to 8:50 GMT)



RGB no correction  
for aerosol effect



RGB surface reflectance  
(corrected for aerosol)



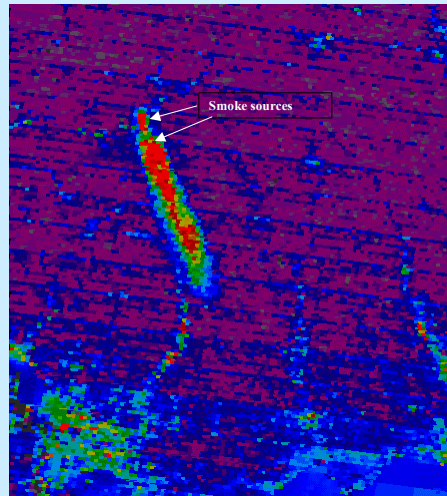
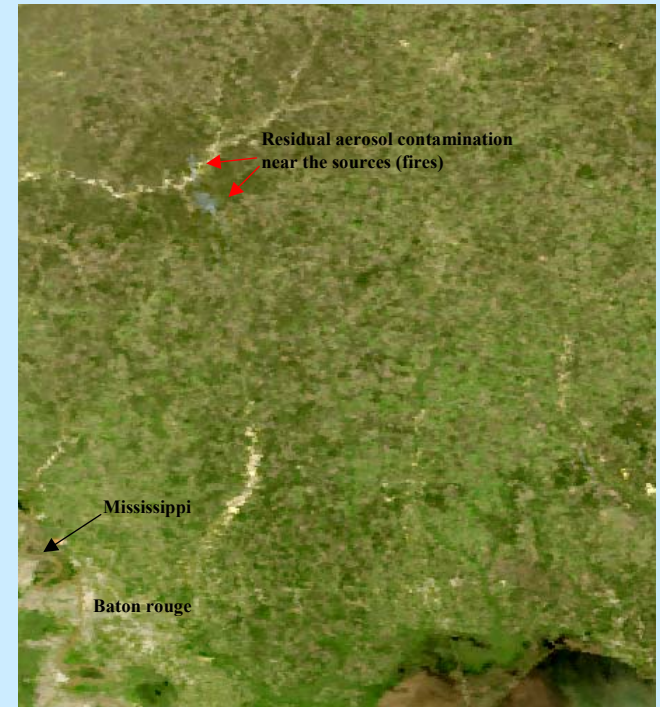
Corresponding aerosol optical  
thickness at 670nm (0 black,  
1.0 and above red) linear  
rainbow scale. Clouds are in  
magenta, water bodies are  
outlined in white.

# MODIS 1km aerosol product

Uncorrected for aerosol



Corrected for aerosol



Aerosol optical thickness (1km resolution)

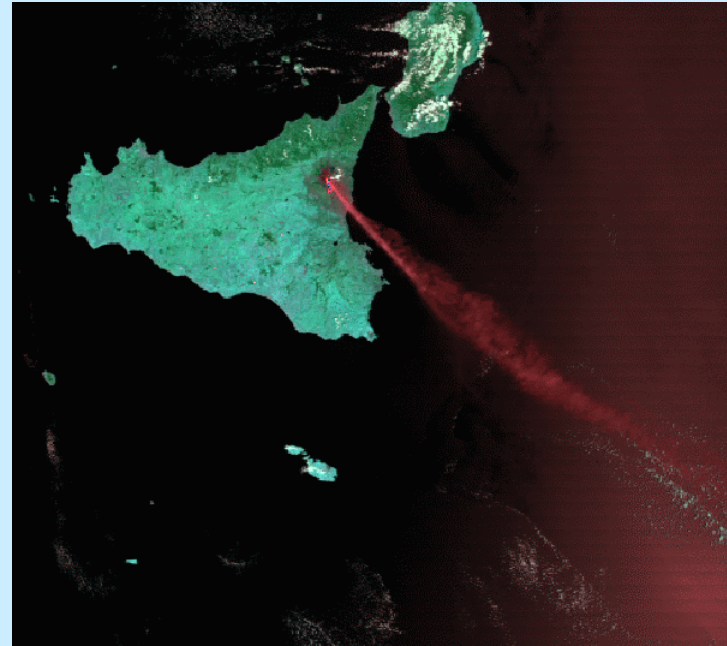


## Heavy/Peculiar aerosol typing

**Mt Etna eruption data acquired by MODIS offers unique opportunity to develop volcanic ash detection technique: middle/shortwave infrared reflectances show a very specific signature of the volcanic ash plume.**

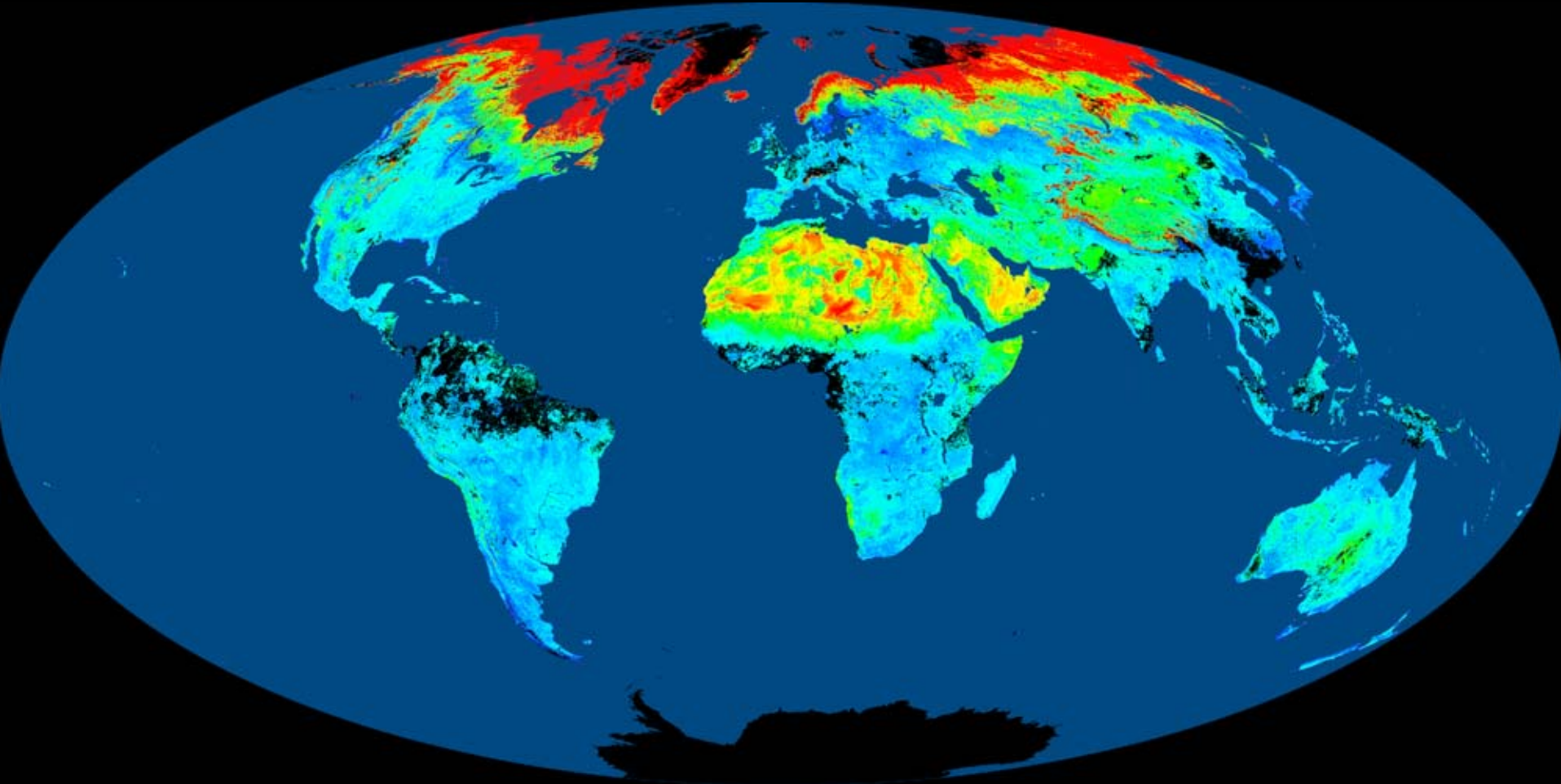


RGB image of the Mt Etna volcanic ash plume. The plume appears gray.



False RGB image of the Mt Etna volcanic ash plume this time using 2.1mic (Blue), 1.6mic (Green) and 3.75mic reflectance (red)

Global Broadband White-Sky Albedo (0.3-5.0 $\mu$ m)  
April 7–22 2001



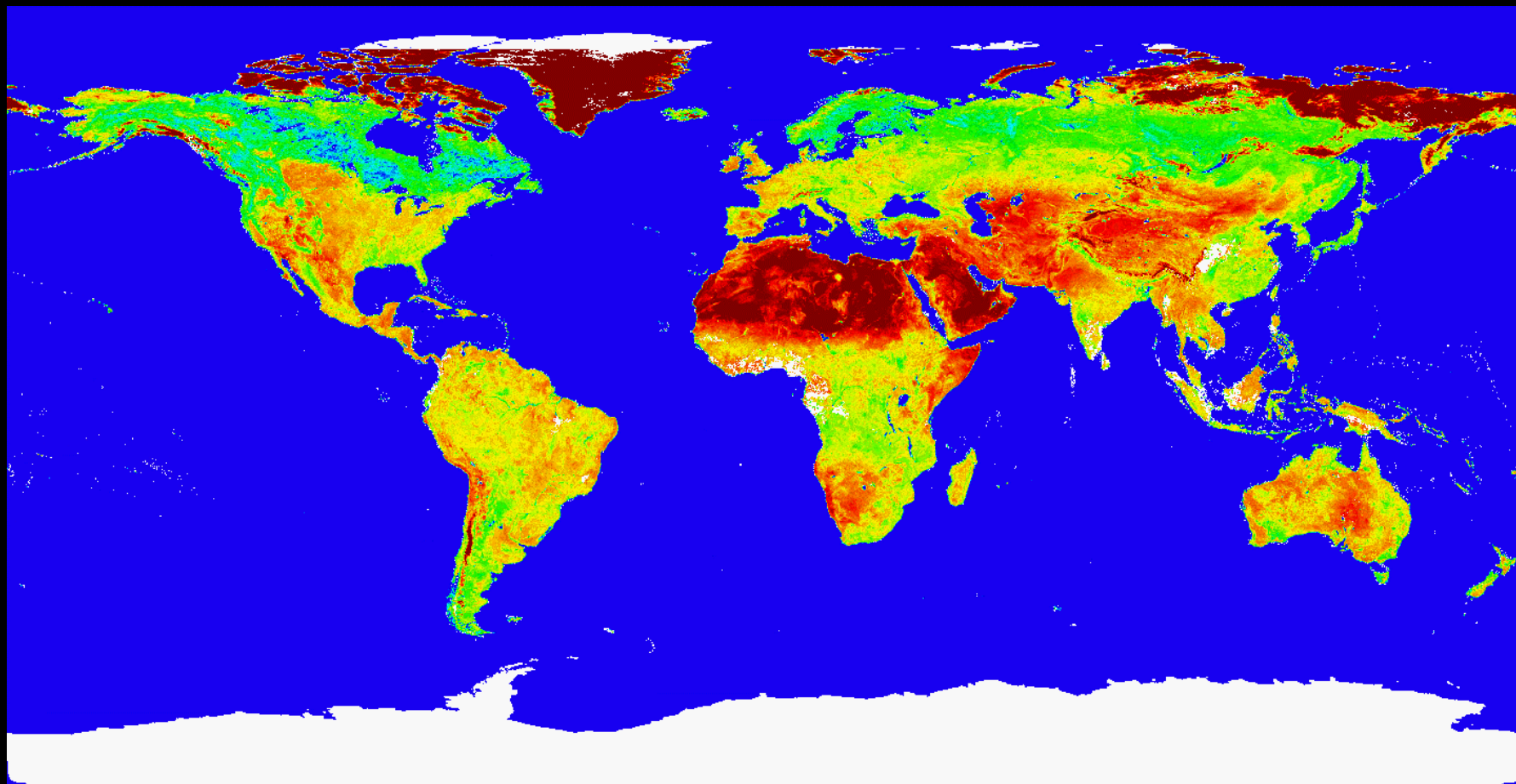
 No data



10 km resolution, Hammer-Aitoff projection,  
produced by MODIS BRDF/Albedo Team

MODLAND/Strahler et al.

CMG Broadband White-Sky Albedo (0.3–5.0 $\mu\text{m}$ )  
14 - 29 September, 2001



No Data

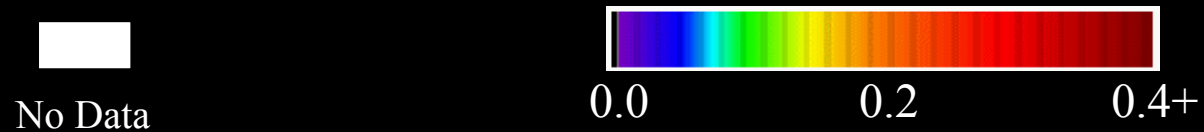
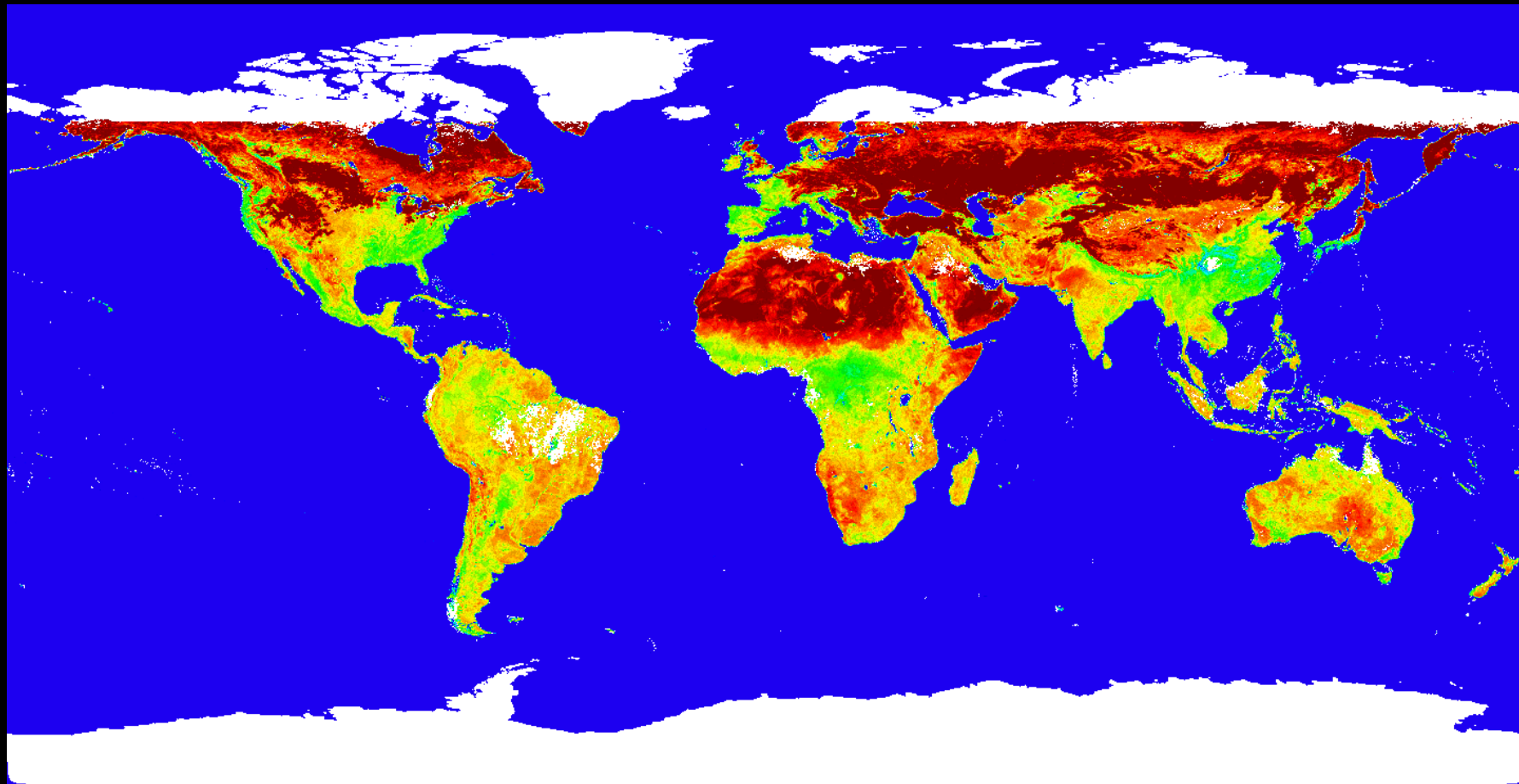


0.0

0.2

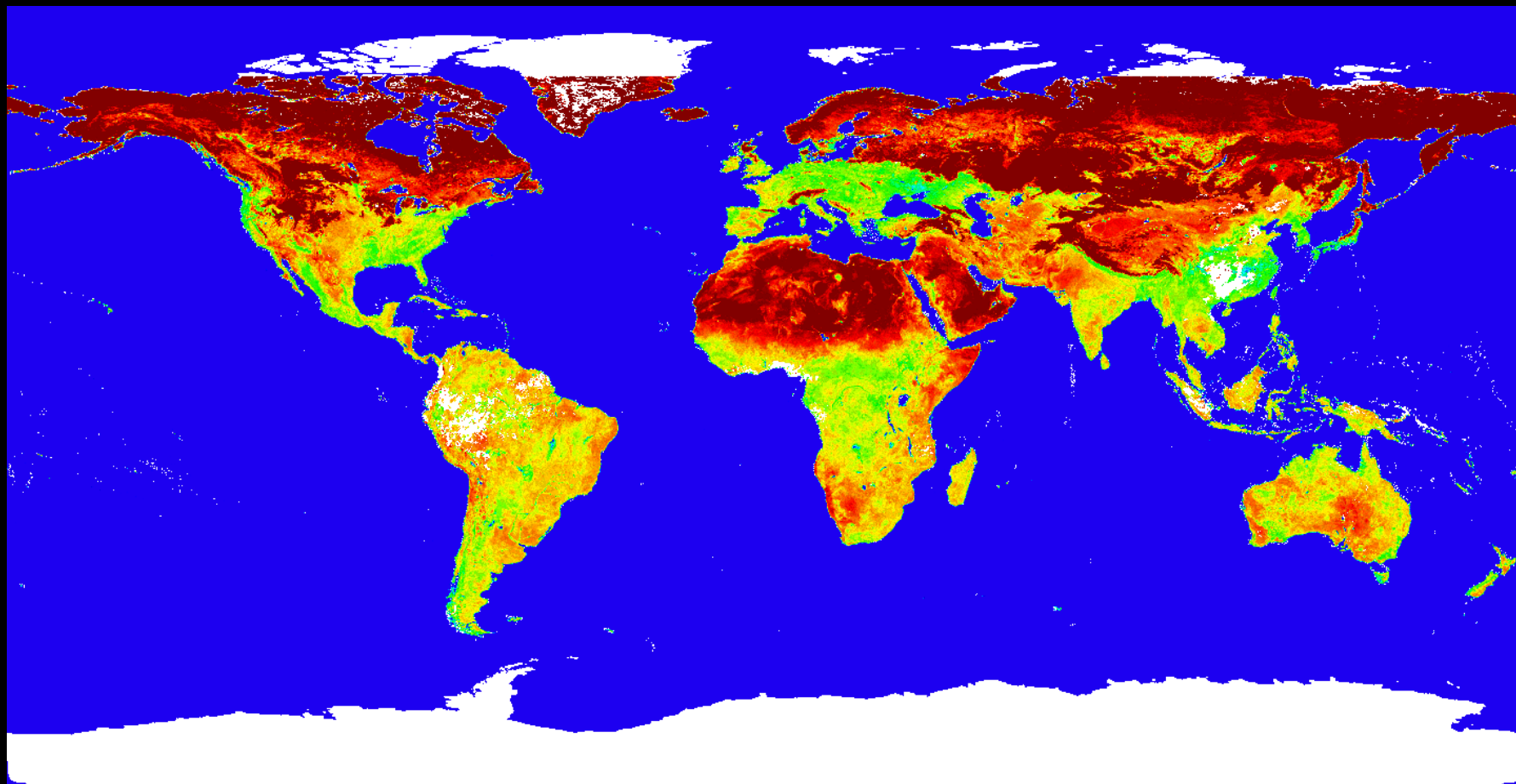
0.4+

CMG Broadband White-Sky Albedo (0.3–5.0 $\mu\text{m}$ )  
1 - 16 January, 2002





CMG Broadband White-Sky Albedo (0.3–5.0 $\mu\text{m}$ )  
18 February - 5 March, 2002



No Data

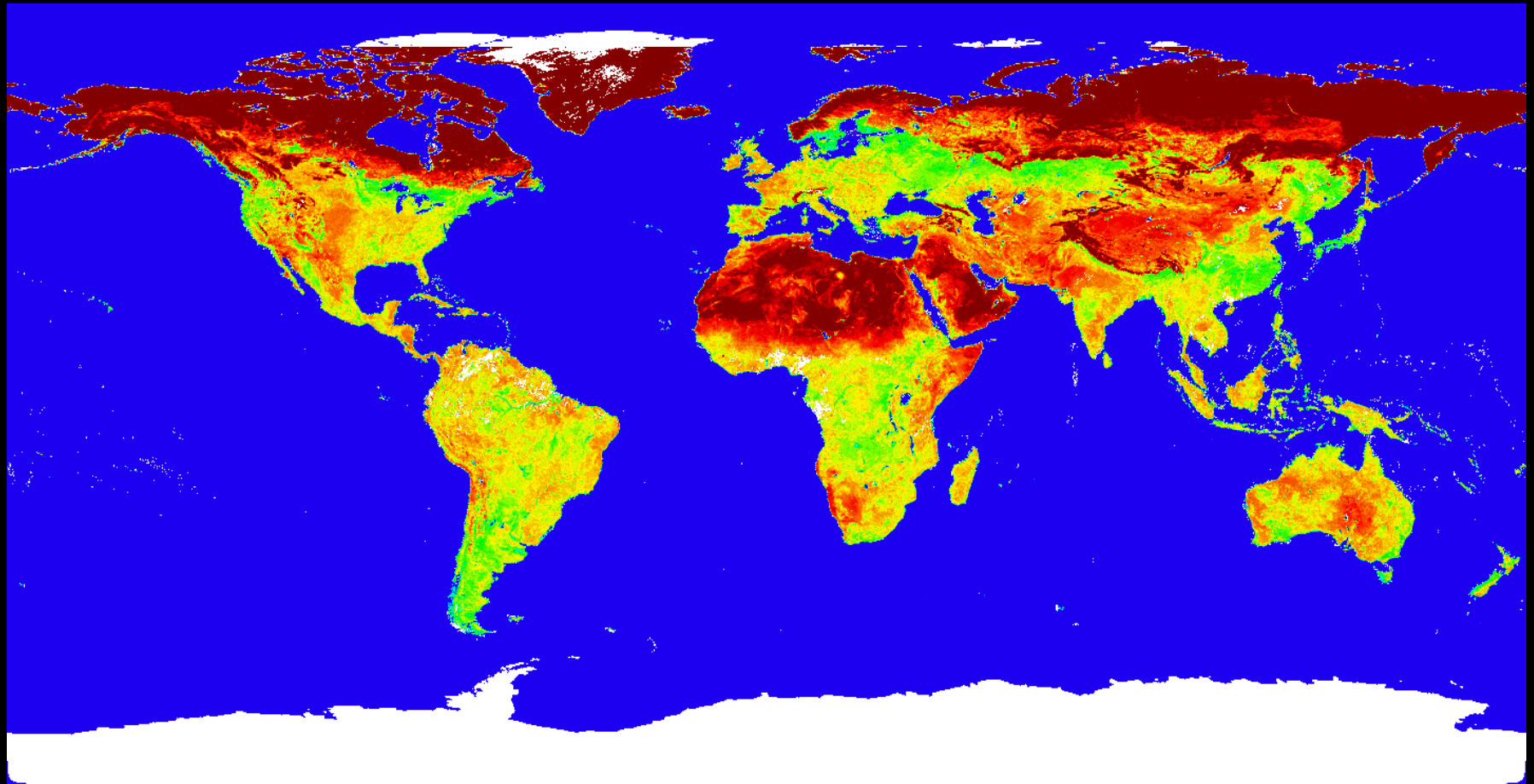


0.0

0.2

0.4+

CMG Broadband White-Sky Albedo (0.3-5.0 $\mu$ m)  
7 - 22 April, 2002



No Data



0.0

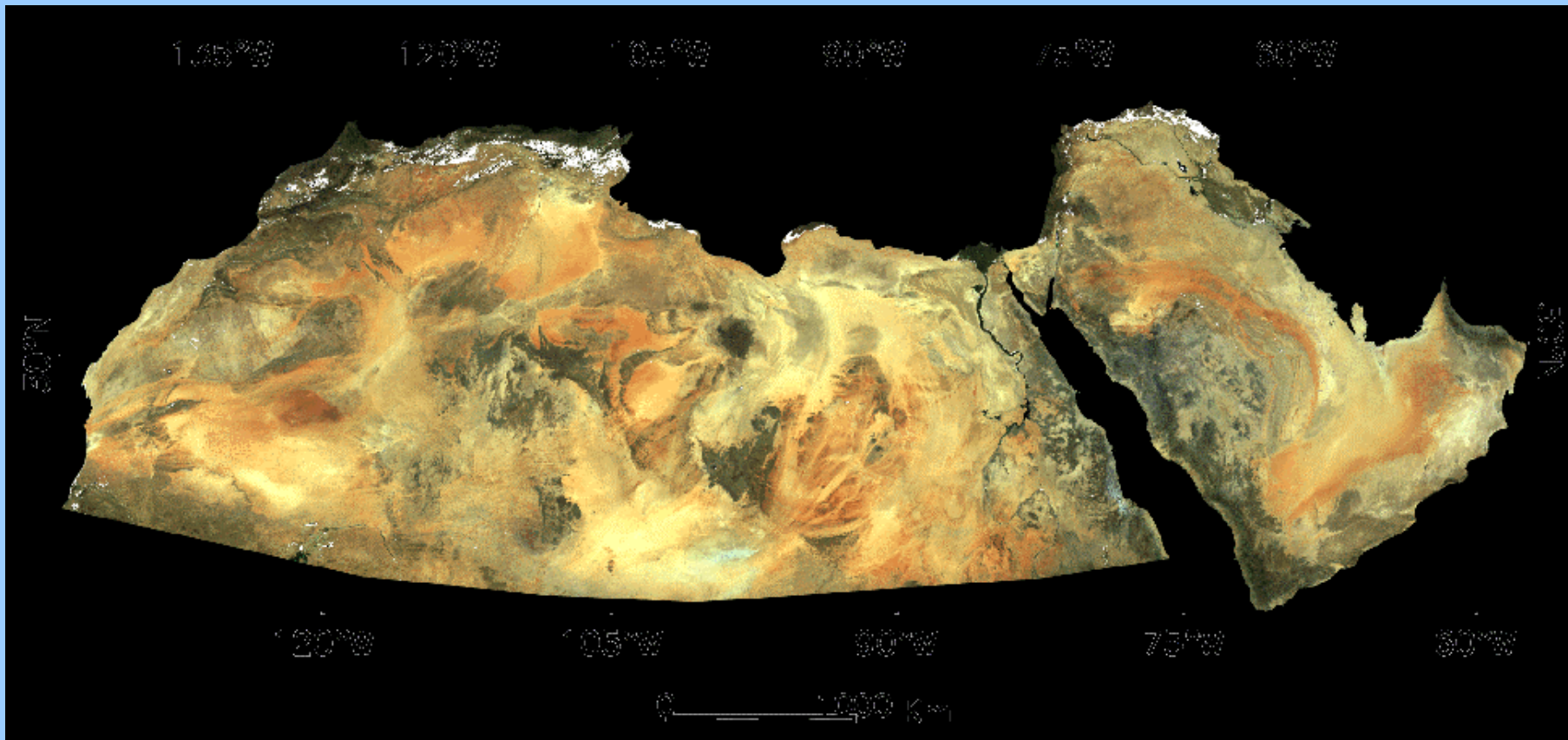
0.2

0.4+



# Desert Albedo

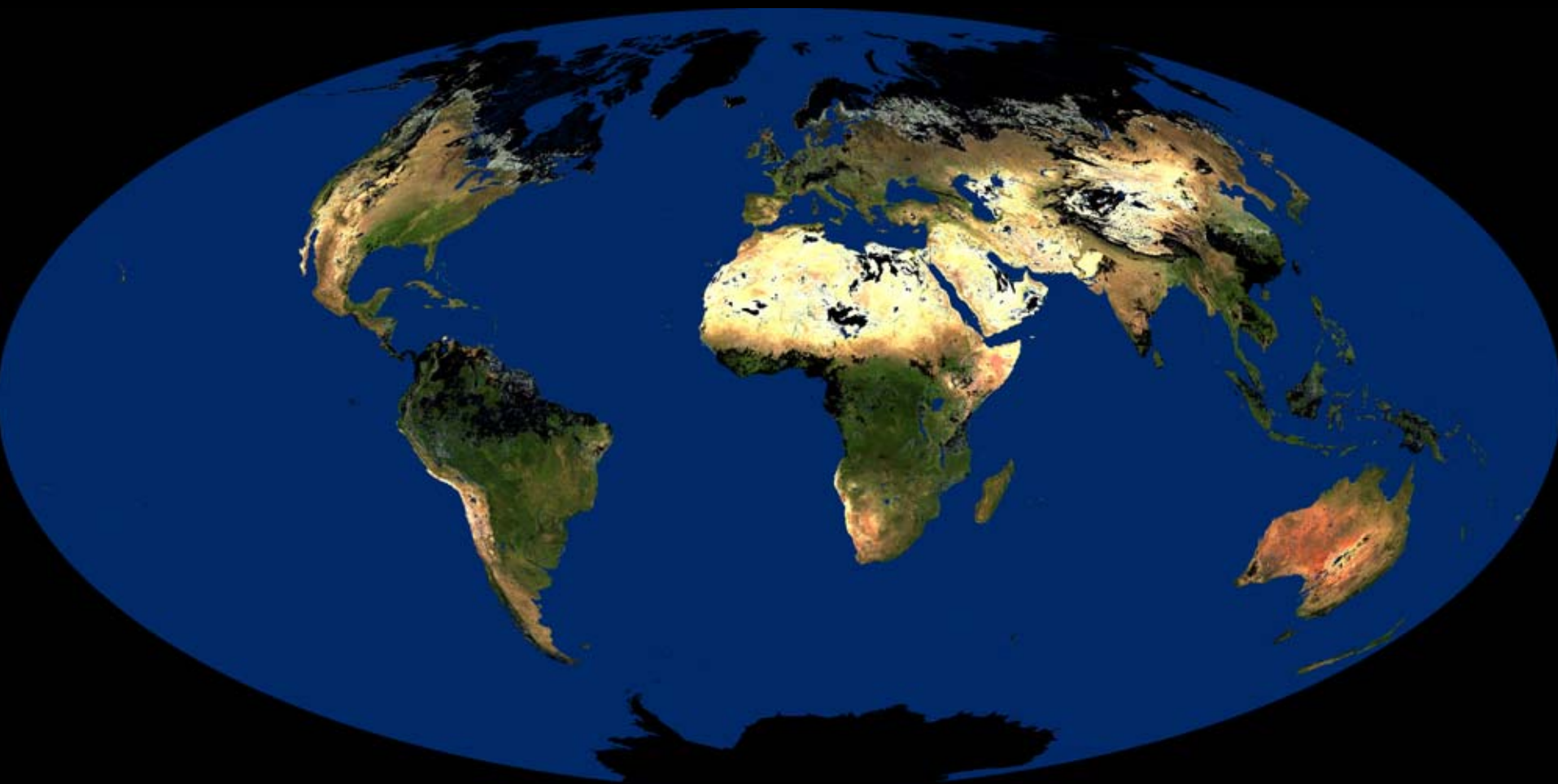
True-color White-sky Spectral Albedo from MODIS



Desert albedos are clearly nonuniform, with implications for global climate modeling

(Tsvetsinskaya et al., GRL, 2002)

# Global Composite Map of Nadir BRDF-Adjusted Reflectance (NBAR) April 7–22 2001



□ No data

True color, MODIS Bands 2, 4, 3

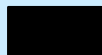
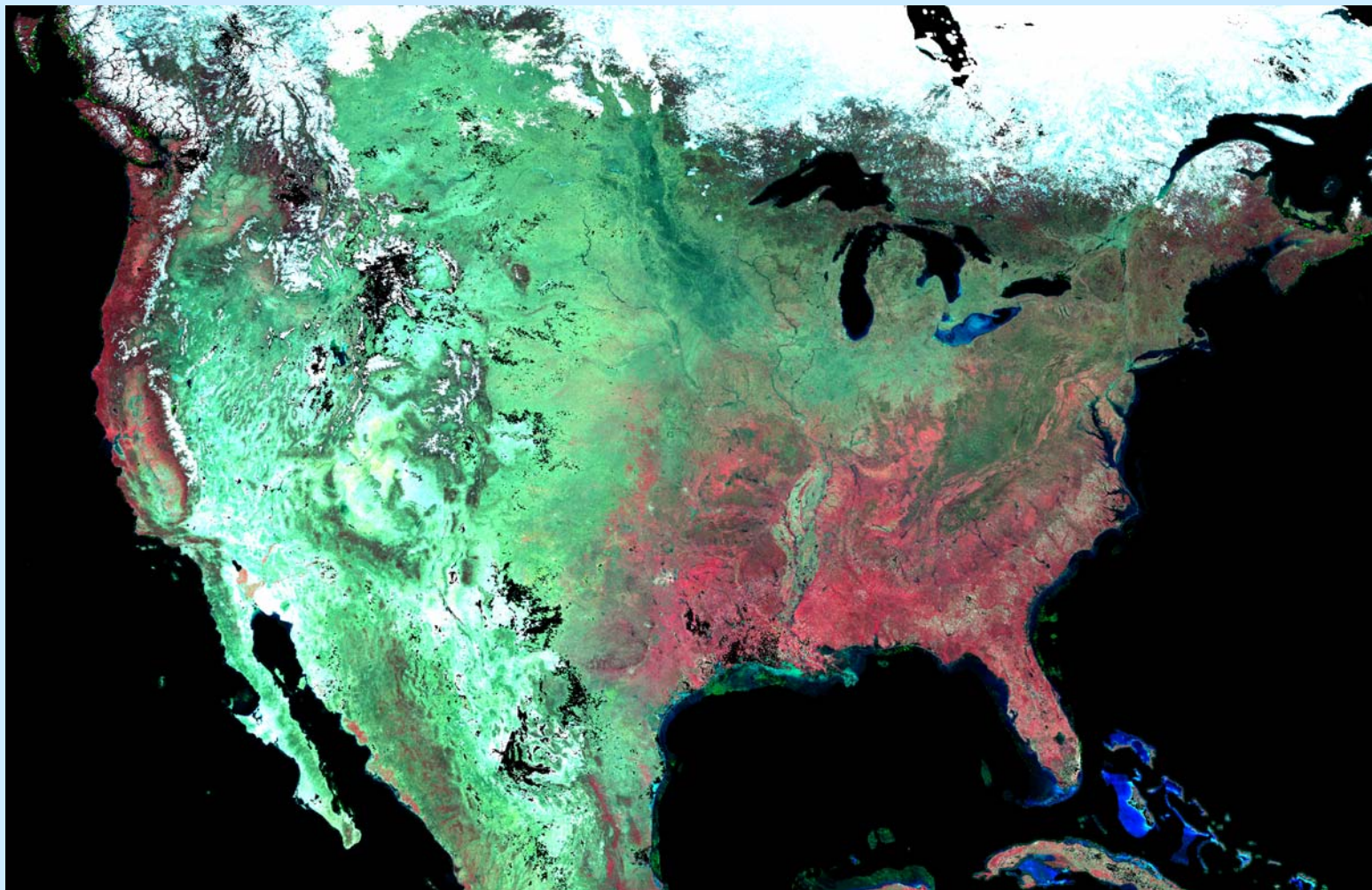
10 km resolution, Hammer-Aitoff projection,  
produced by MODIS BRDF/Albedo Team

**MODLAND/Strahler et al.**



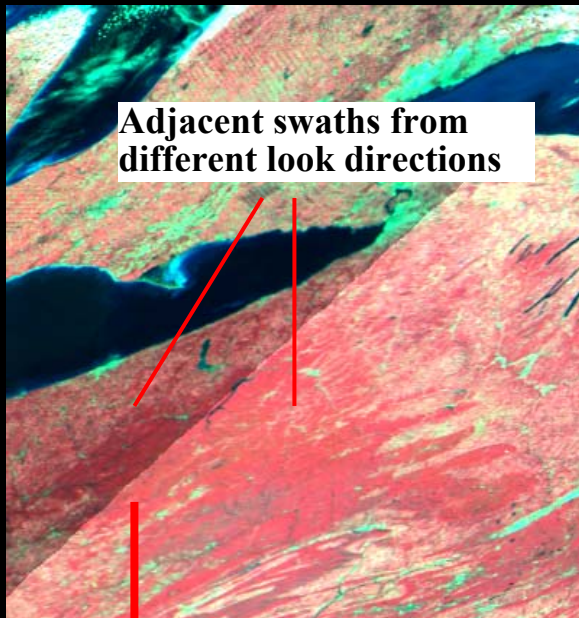
# Nadir BRDF-Adjusted Reflectance (NBAR)

7 - 22 April, 2002



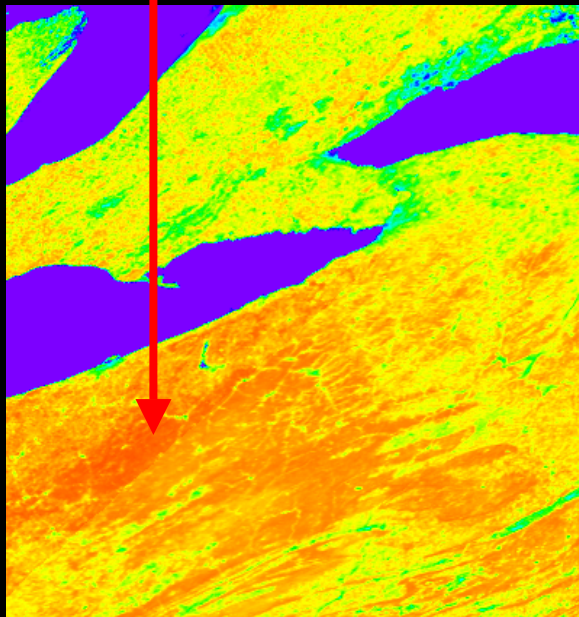
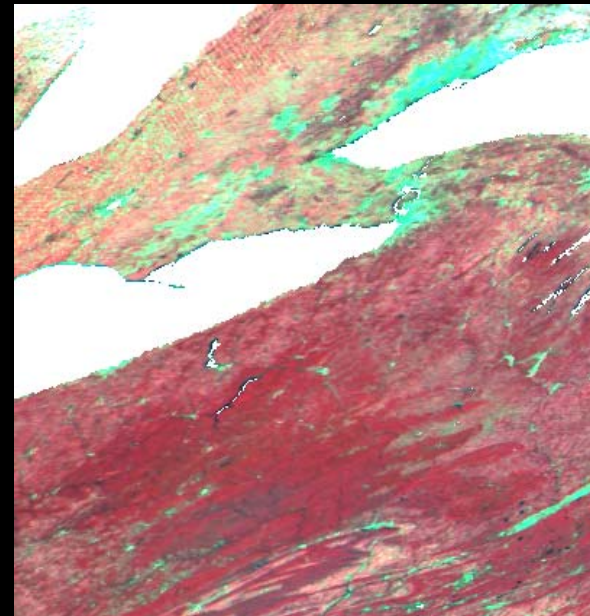
No Data

NIR (0.1-0.4) Red (0.0-0.16) Green (0.0-0.18)



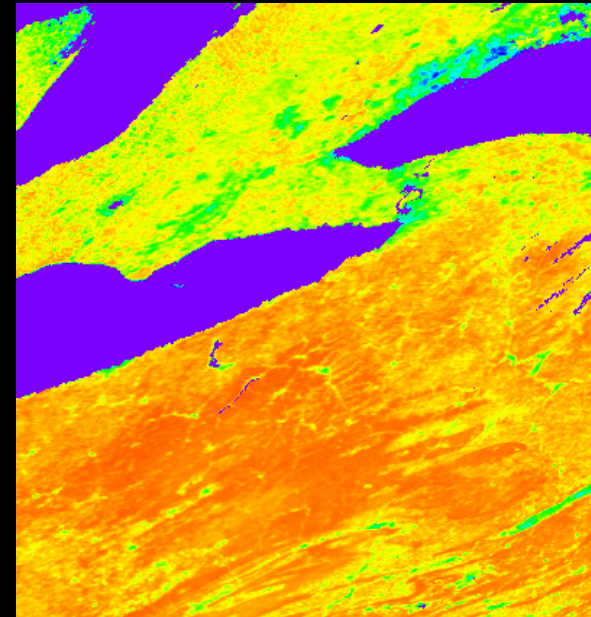
Use of Nadir BRDF-Adjusted Reflectance (NBAR) for reducing viewing geometry effects

Color infrared images  
Bands 2, 1, 4  
(NIR, Red, Green)



Tile: h12v04  
Pixels (1,712)-  
(400,1111)  
Julian day: 2000250  
(Sept. 6, 2000)

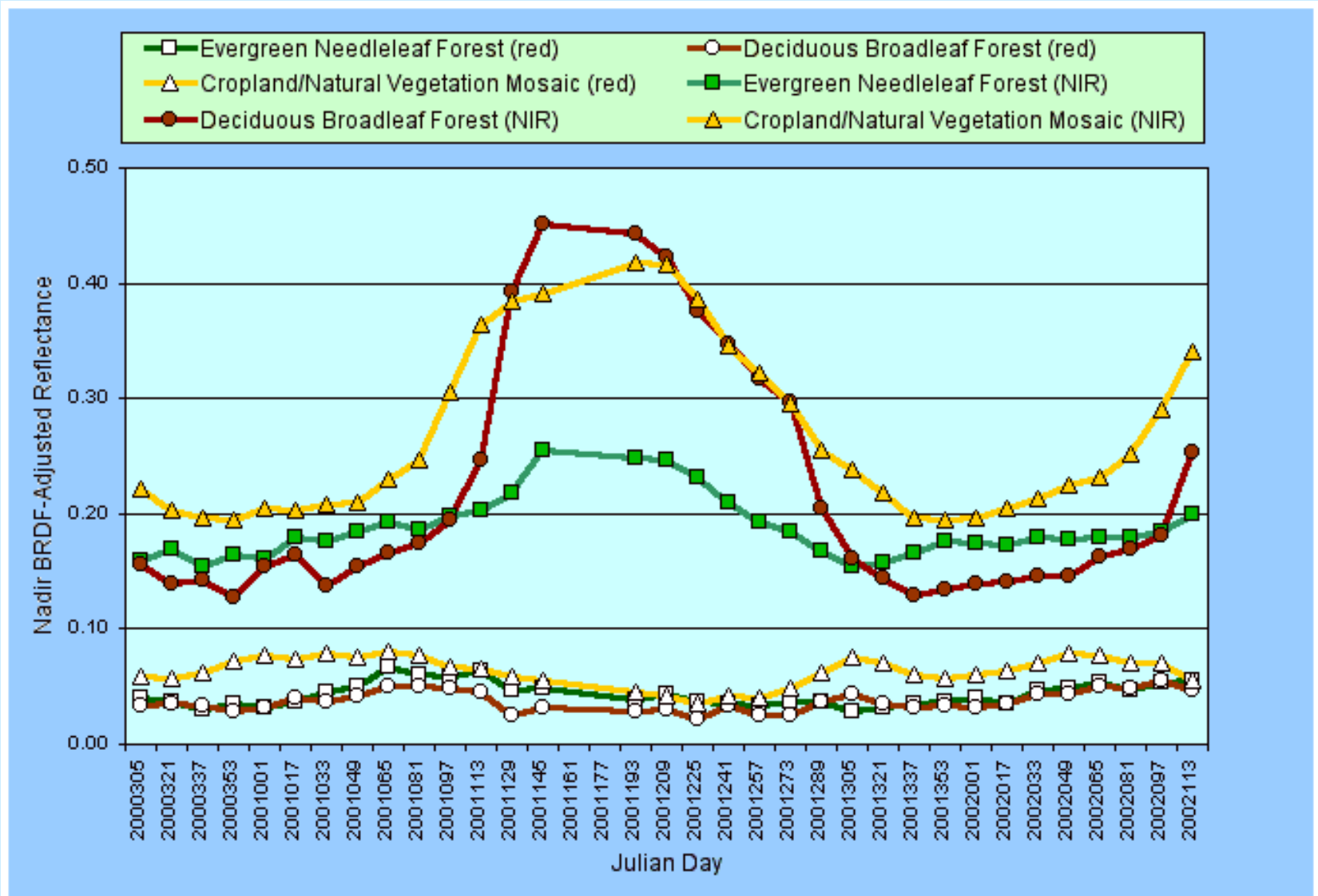
0.1 1.0



MODLAND/Strahler et al.



# NBAR from Land Cover Training Sites in the Southern US



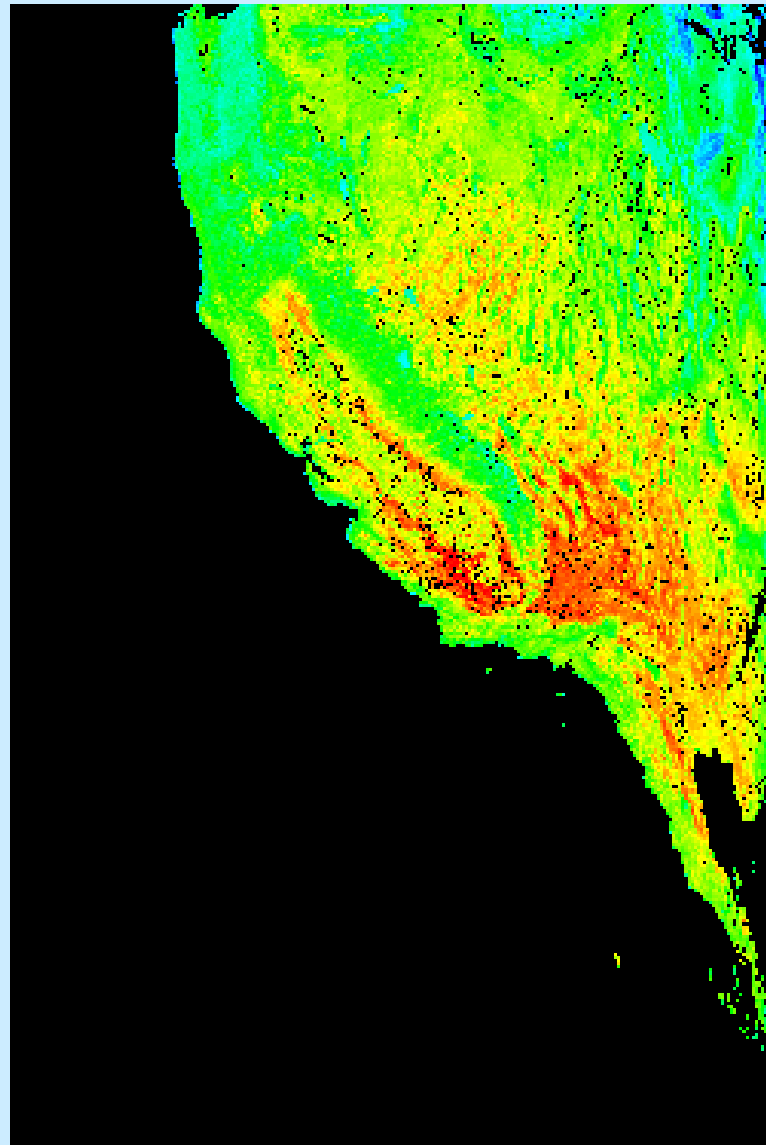
Schaaf et al., First Operational BRDF, Albedo and Nadir Reflectance Product from MODIS, in press, Remote Sensing Environ., 2002

MODIS

Western North  
America

Land surface  
temperature

September 20 2000



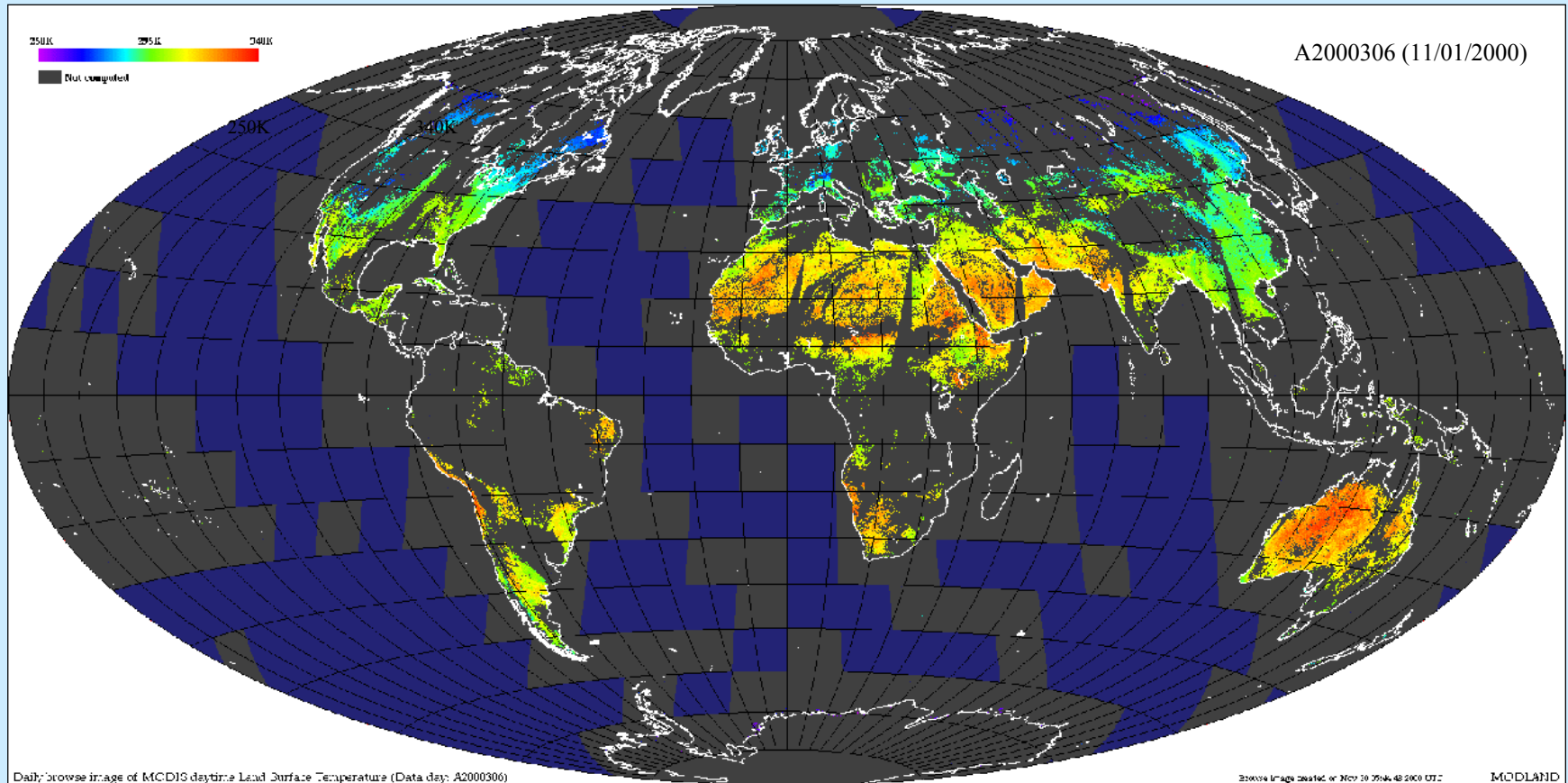
250 K

335 K

(MODLAND/Wan)

# *MODIS LST Product*

Global browse image at 5km resolution of the **daytime** 1km LST product from first B-side MODIS data



1km daily L2/L3 LSTs since late July 2000  
1km 8-day L3 LST since late August, 2000

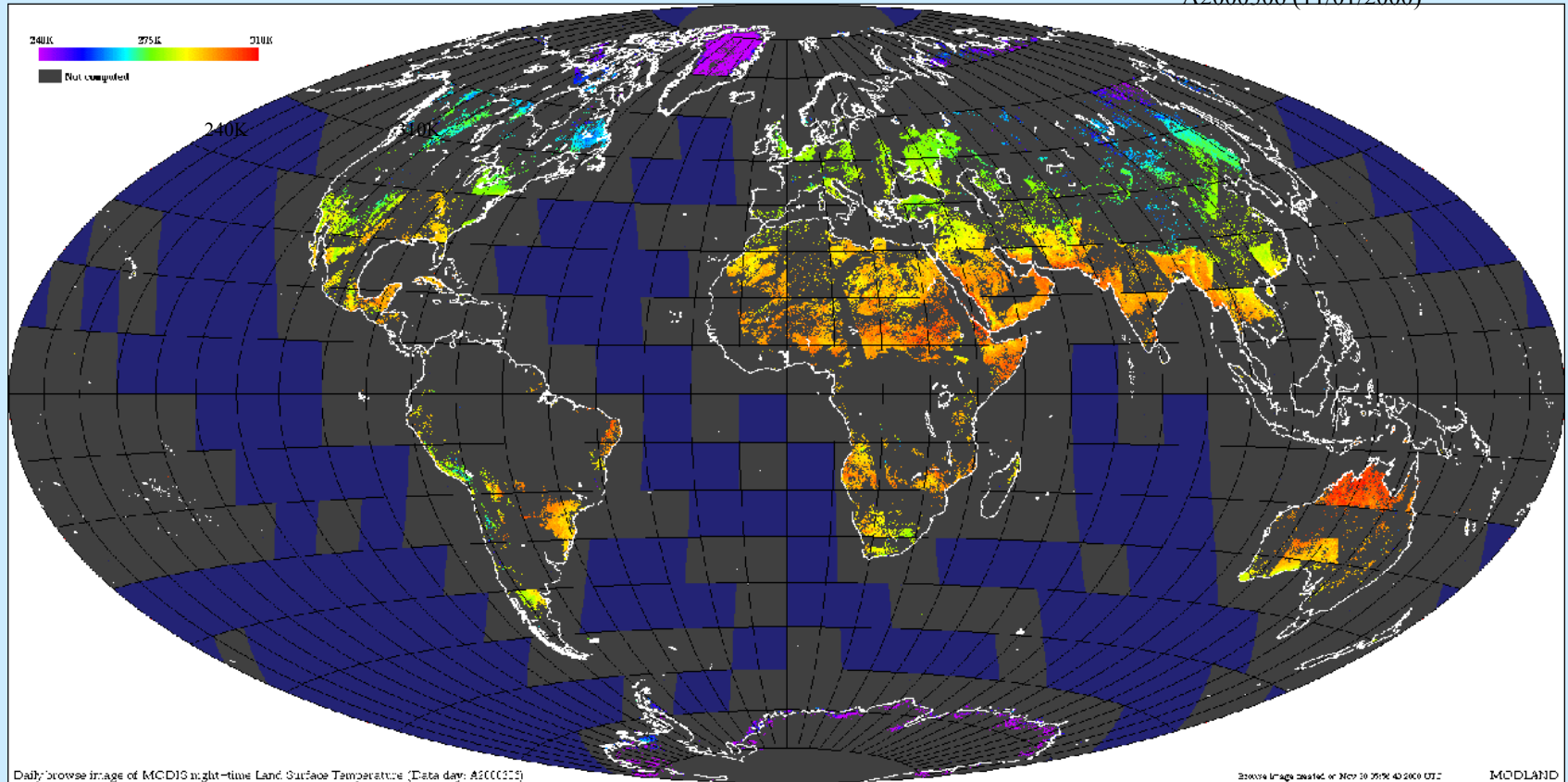
Courtesy of MODAPS, MODLAND, and LDOPE

Z. Wan -2-  
MODLAND/Wan

# ***MODIS LST Product***

Global browse image at 5km resolution of the **nighttime** 1km LST product from first B-side MODIS data

A2000306 (11/01/2000)

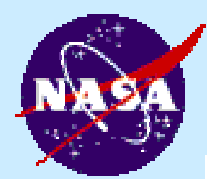


**Wan: LST over Mono Lake, better than +/- .6K**

Courtesy of MODAPS, MODLAND, and LDOPE

**Hook: LST Tahoe MODIS bands 29,31,32, accuracy +/- 0.4K.**

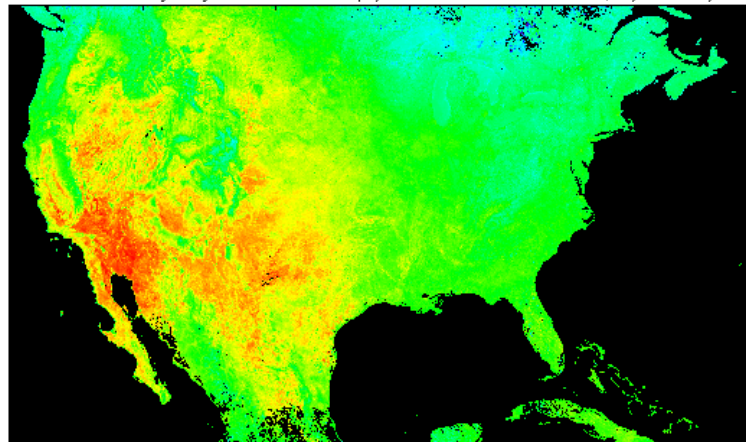




# MOD11A2 – the 8-day Land-Surface Temperature product

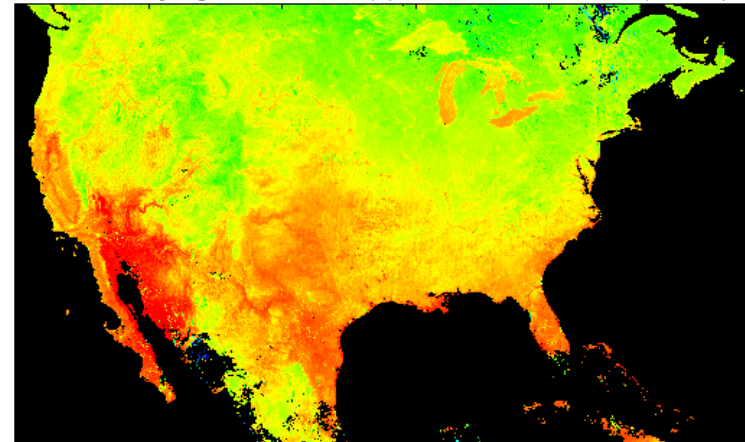


Mosaic of 8-day daytime 1km LST (K) in MOD11A2.A2000257, 9/13–20/00



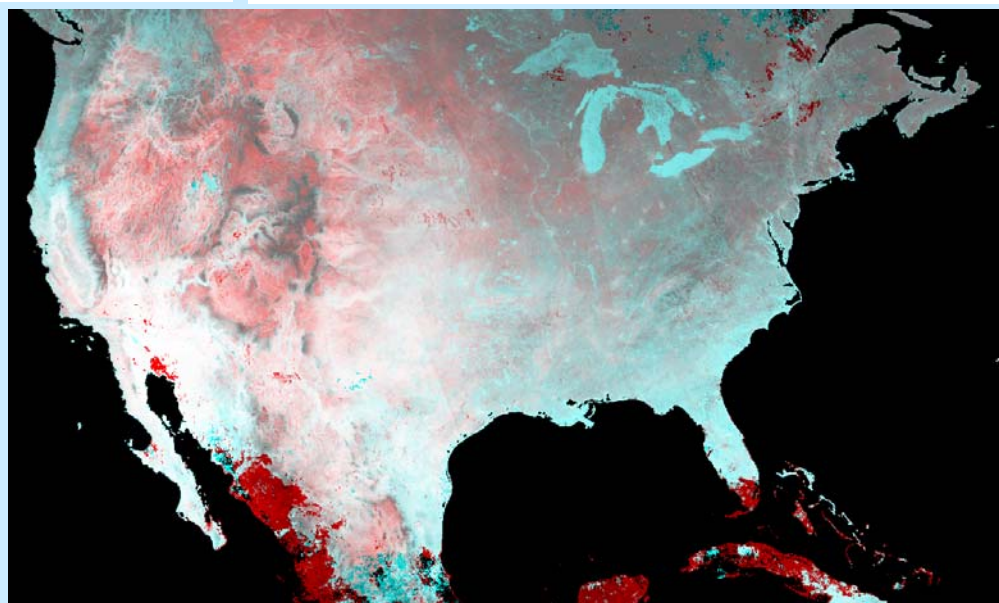
250.10 291.18 332.26

Mosaic of 8-day nighttime 1km LST (K) in MOD11A2.A2000257, 9/13–20/00



230.00 268.08 306.16

Color composite with the 8-day daytime LST as the red component, and the 8-day nighttime LST as the green and blue components after histogram-equalization enhancement. The pixels with daytime LST values but without nighttime LST values are in red..



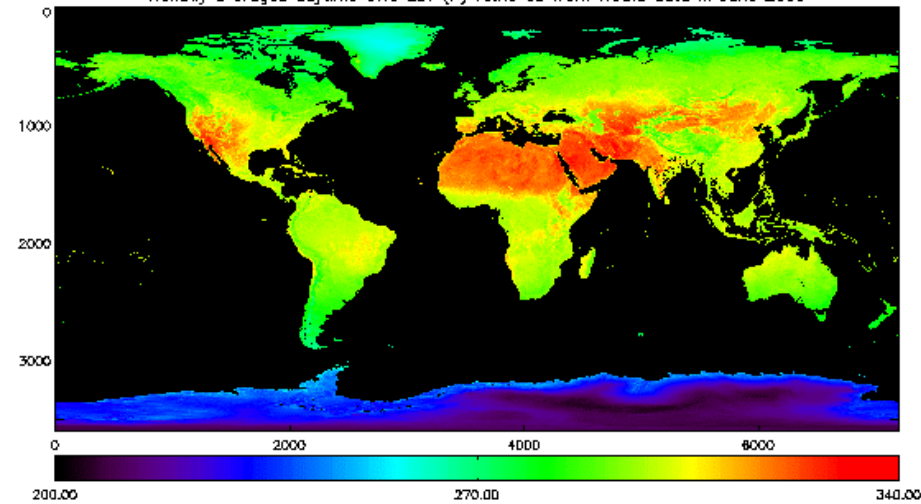
Institute for  
Computational Earth System Science  
University of California, Santa Barbara

# MODIS Monthly composited land surface temperature

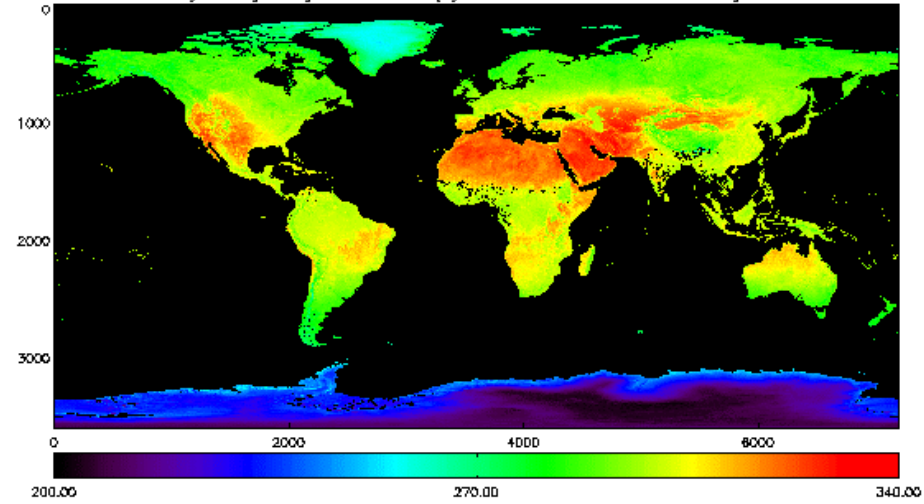
June 2000

July 2000

Monthly averaged daytime CMG LST (K) retrieved from MODIS data in June 2000



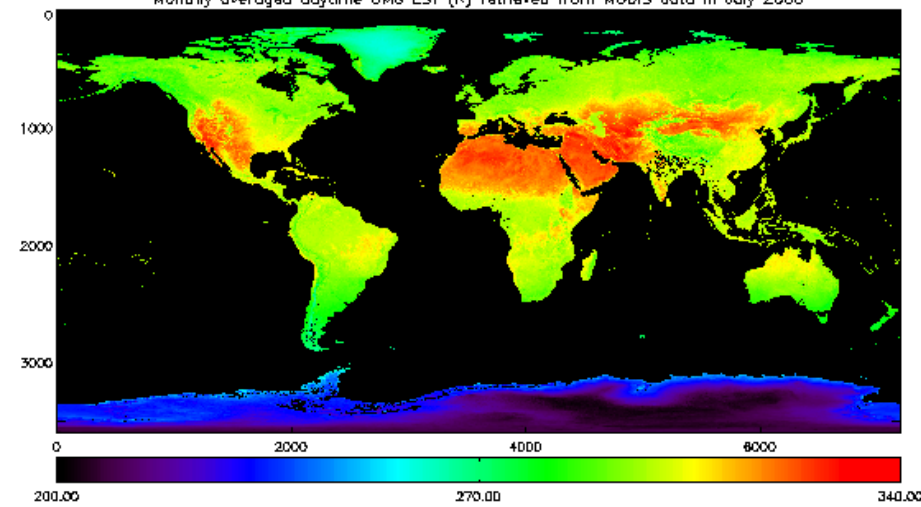
Monthly averaged daytime CMG LST (K) retrieved from MODIS data in August 2000



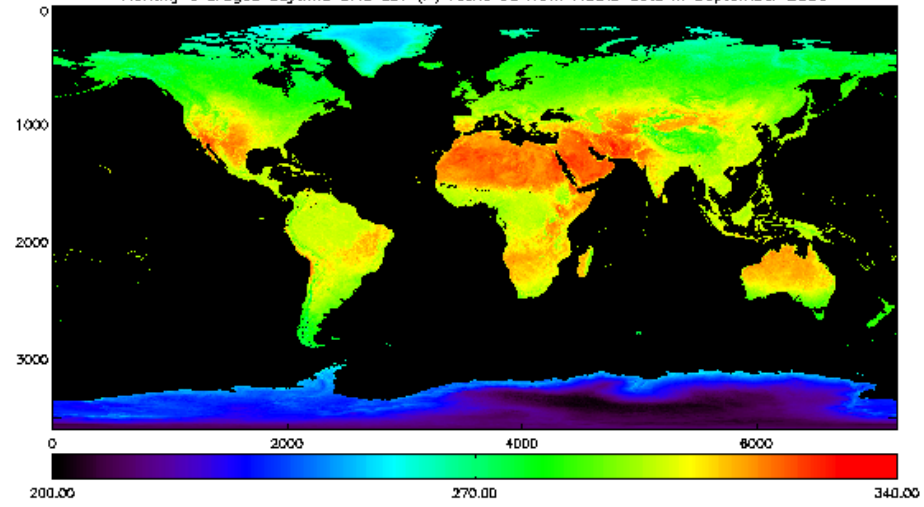
(MODLAND/Wan) August 2000

September 2000

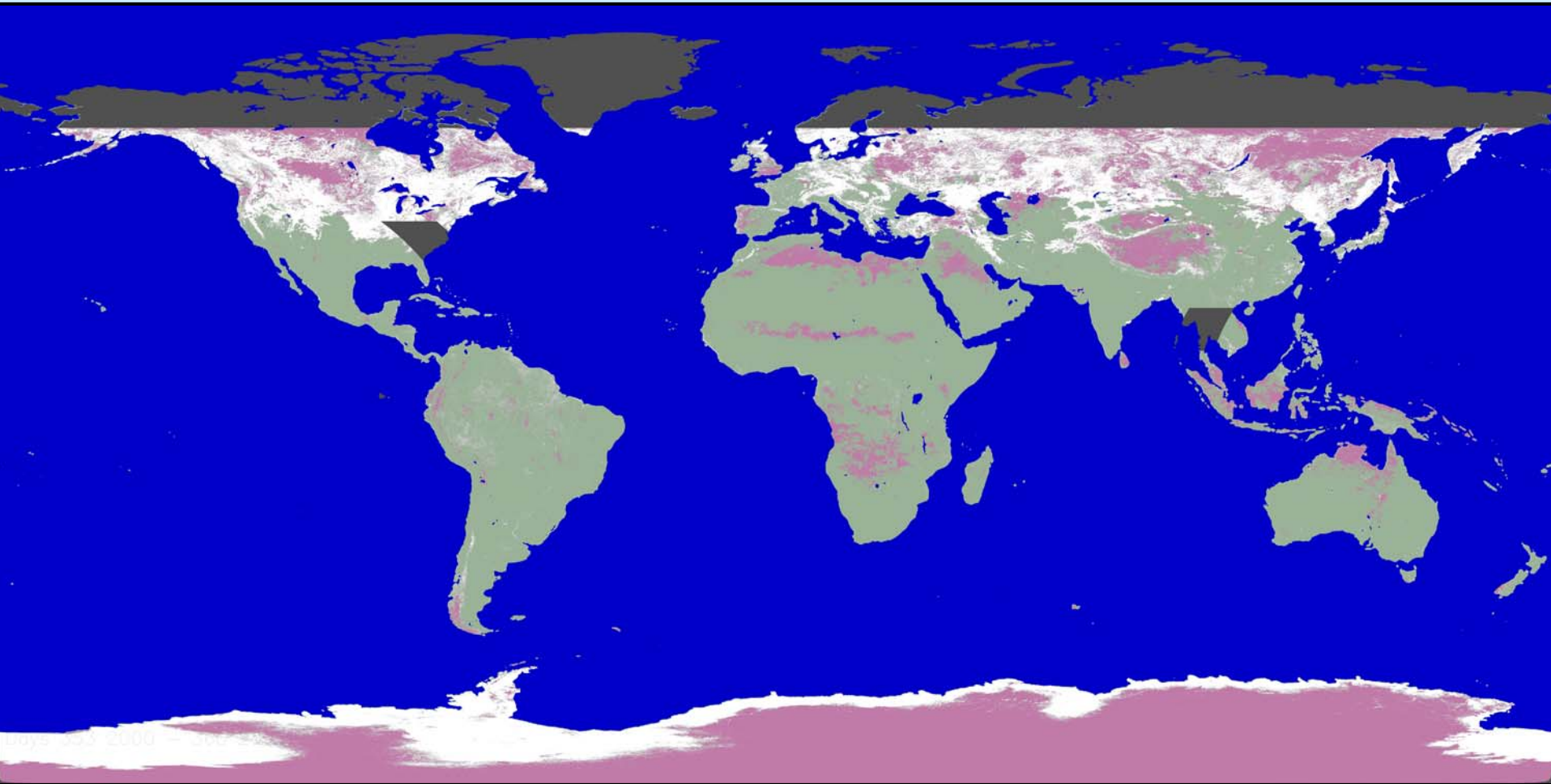
Monthly averaged daytime CMG LST (K) retrieved from MODIS data in July 2000



Monthly averaged daytime CMG LST (K) retrieved from MODIS data in September 2000

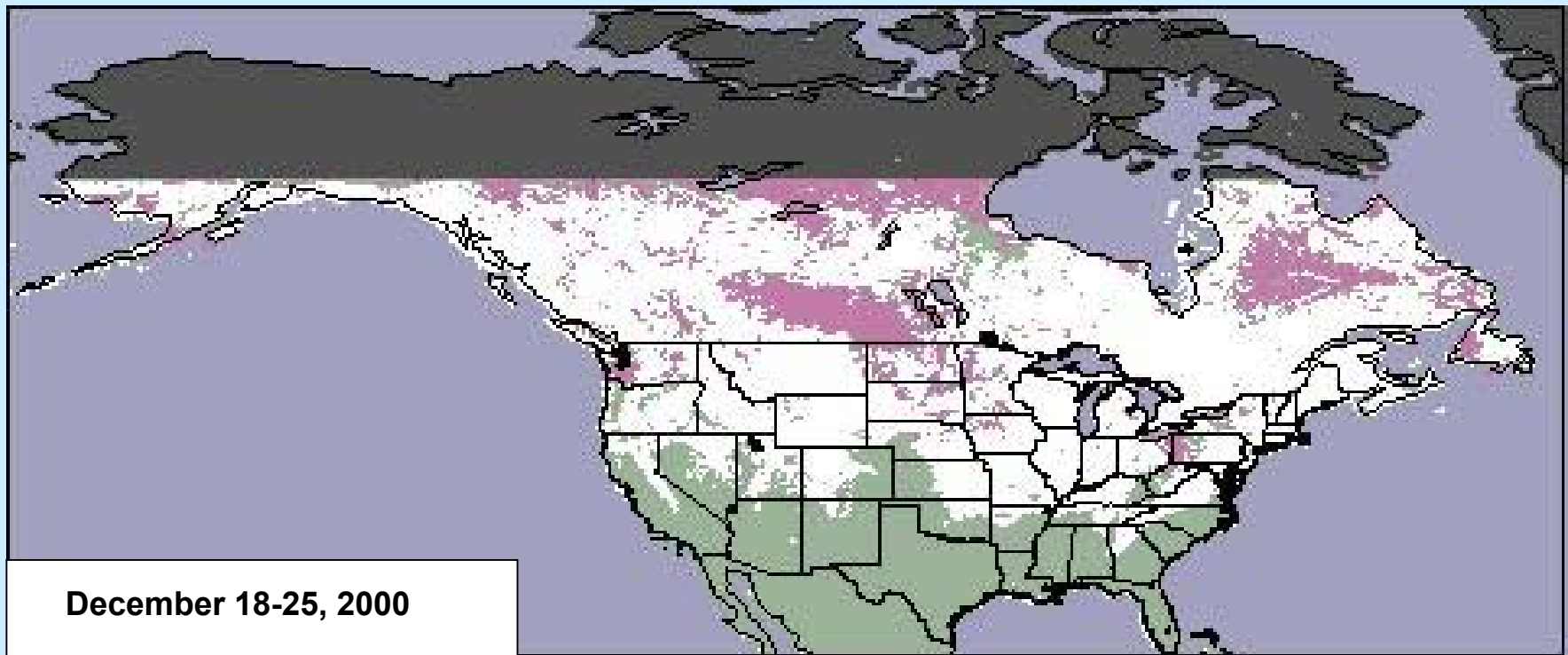


***Eight-Day Composite Global Climate Modeling  
Grid Snow Map (5.6-km resolution, 1/20°)  
December 18 - 25, 2000***





## ***Eight-day Composite - December 18-25, 2000***



**Snow**



**Non-snow**

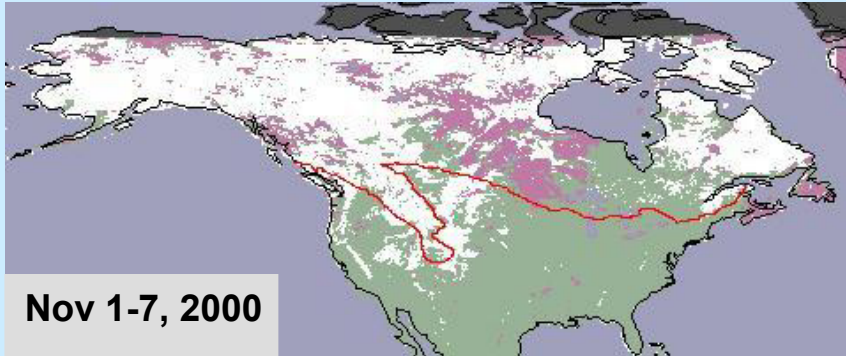


**Darkness**

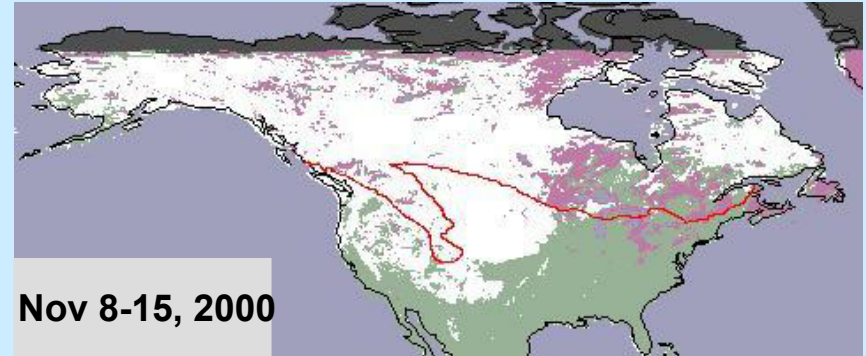


**Cloud**

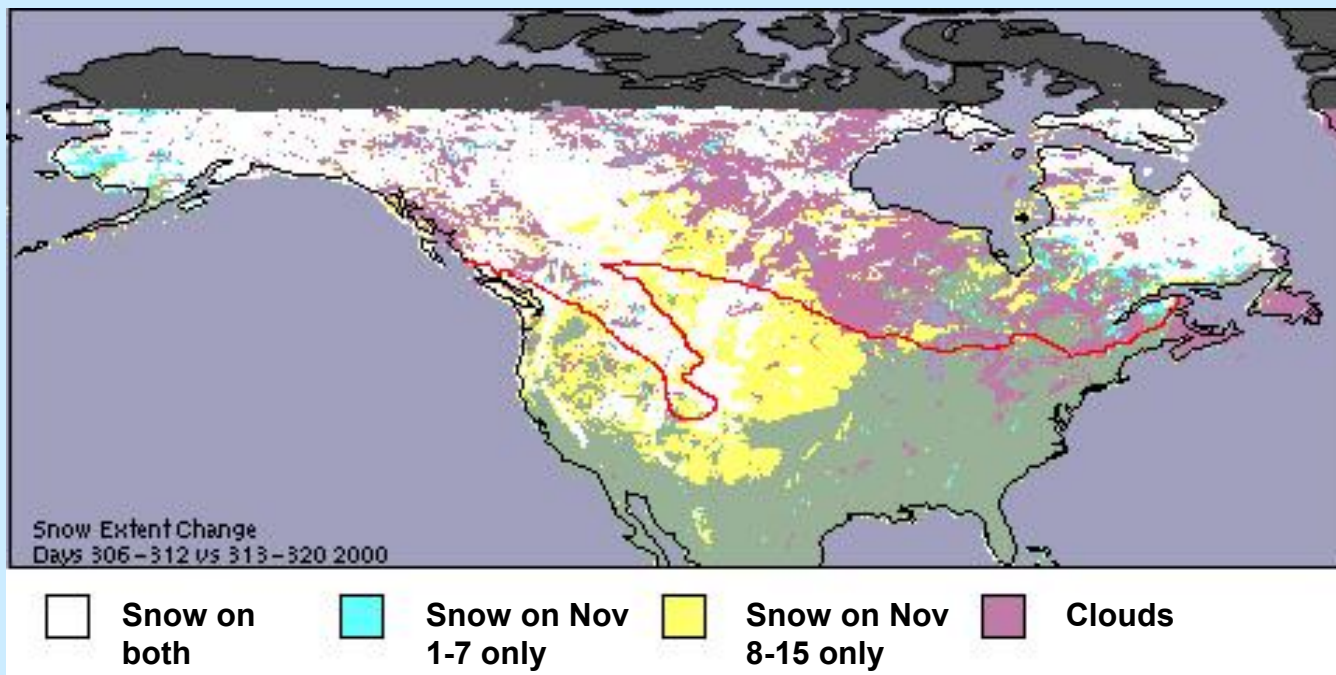
9.0 million sq. km of snow cover



10.8 million sq. km of snow cover



***Change in maximum snow extent between two composite periods seen above (1.8 million sq. km)***



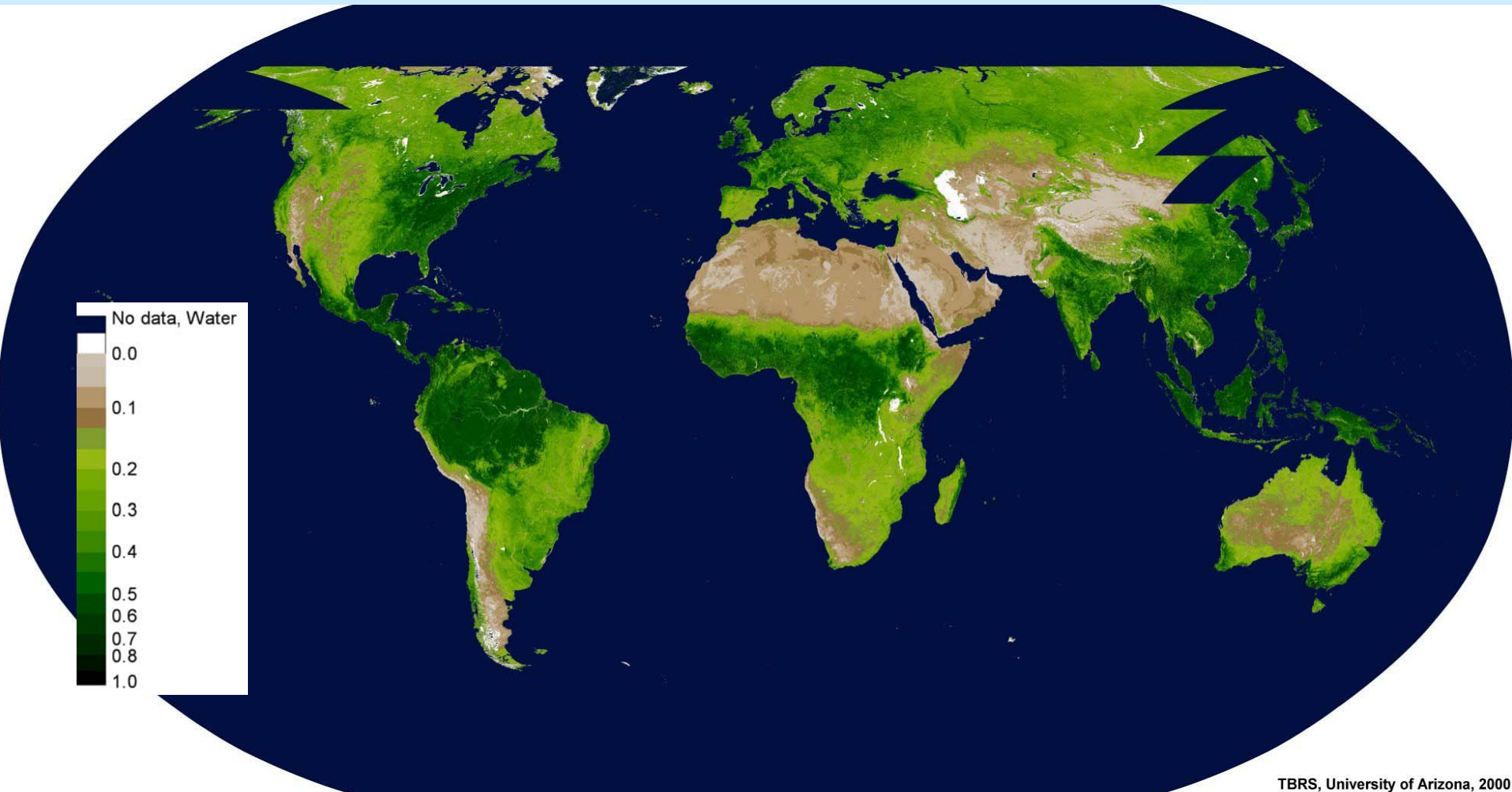
# MODIS Product Suites

- *Energy Balance Product Suite*
  - Surface Reflectance
  - Land Surface Temperature
  - BRDF/Albedo
  - Snow Cover
- *Vegetation Parameters Suite*
  - Vegetation Indices
  - LAI/FPAR
  - NPP/PSN
- *Land Cover/Land Use Suite*
  - Land Cover/Vegetation Dynamics
  - Vegetation Continuous Fields
  - Vegetation Cover Change
  - Fire and Burned Area



# MODIS

Enhanced vegetation index  
16-day composite



TBRS, University of Arizona, 2000

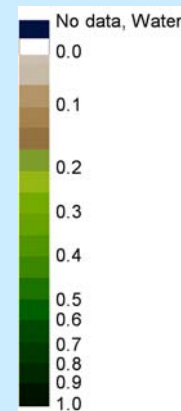
(MODLAND/Huete)

# MODIS 500 m Vegetation Indices

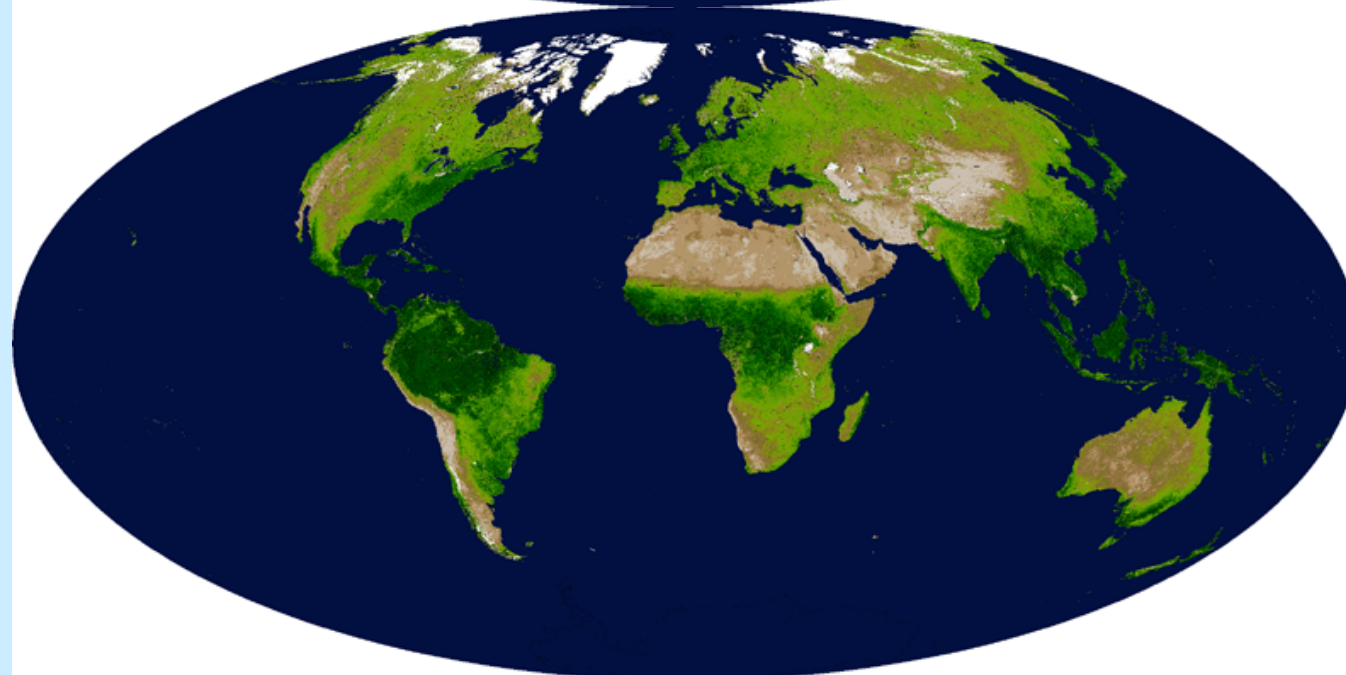
September 30 –  
October 15, 2000



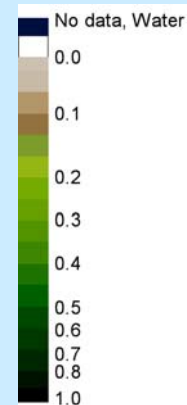
*NDVI*



MOD13A1 16 day  
Composite



*EVI*



MODLAND/Huete et al



NDVI



EVI



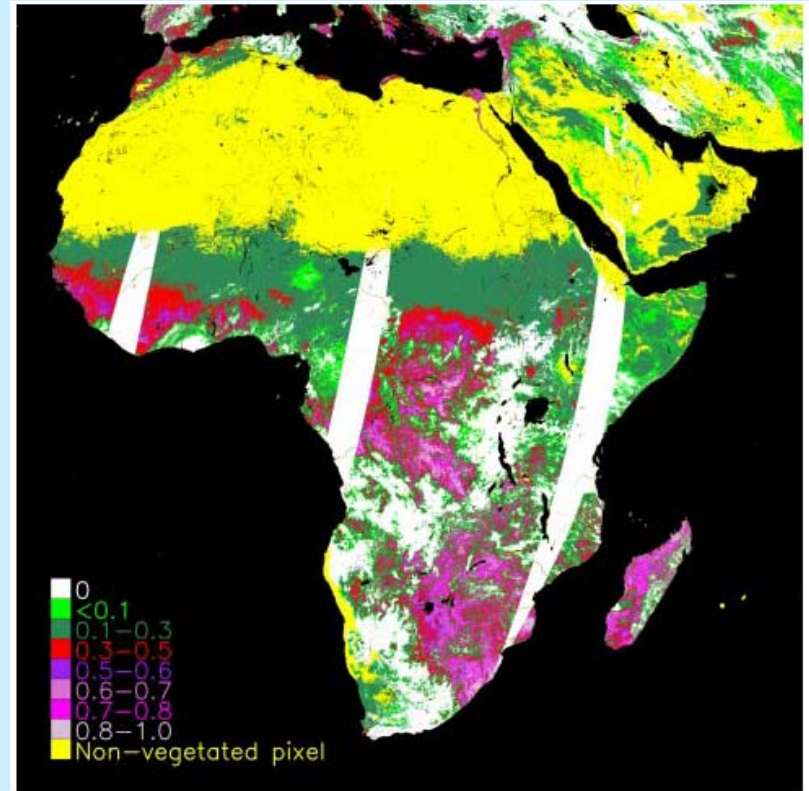
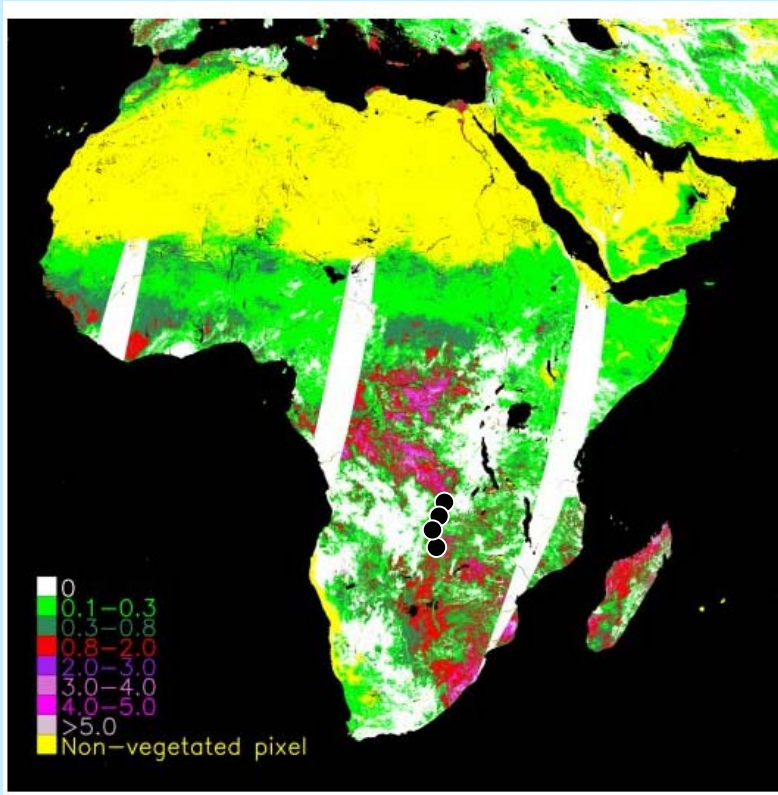


# MODIS LAI and FPAR

Maps for March-25-2000

LAI

FPAR



**MOD15A1 LAI (left panel) and FPAR (right panel) maps of March-25-2000. Black dots on the left panel indicate the locations of the SAFARI 2000 Wet Season Field Campaign Sites: Pandamatenga (top dot), Maun, Okwa and Tshane (lower dot).**

MODLAND/Myneni et al.

# MODIS

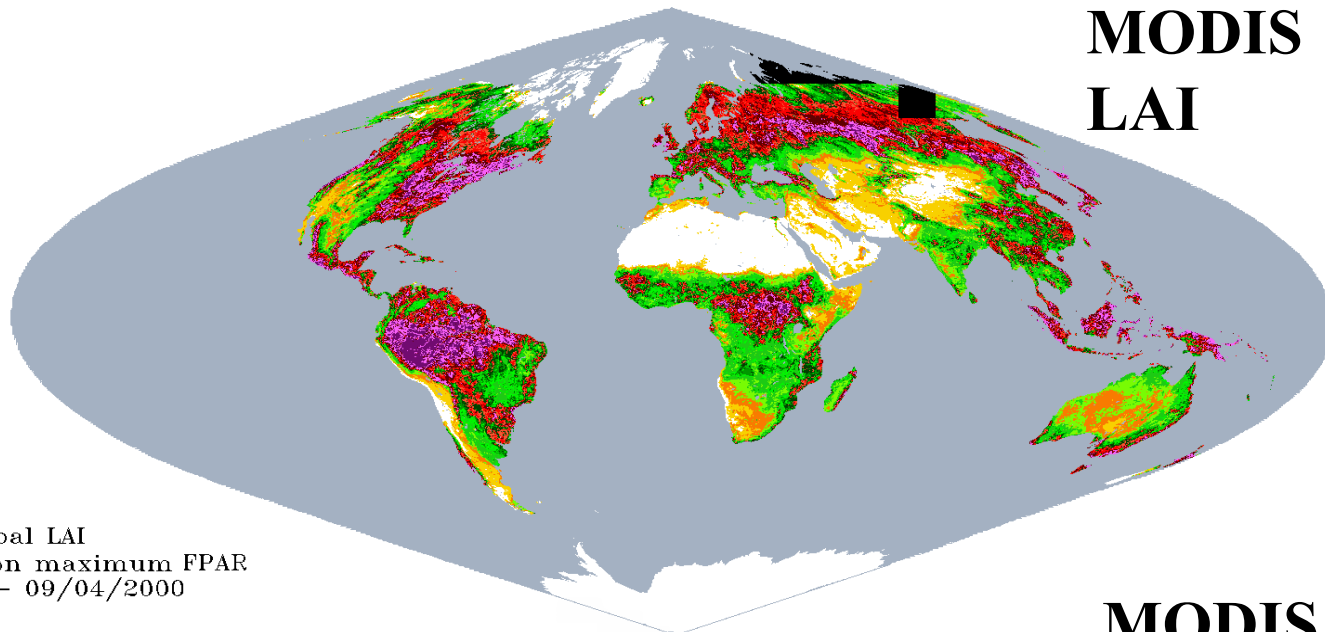
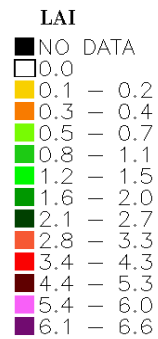
## Leaf-Area Index (LAI)

## Fraction of Photosynthetically-Active Radiation (FPAR)

March 24 – April 8 2000



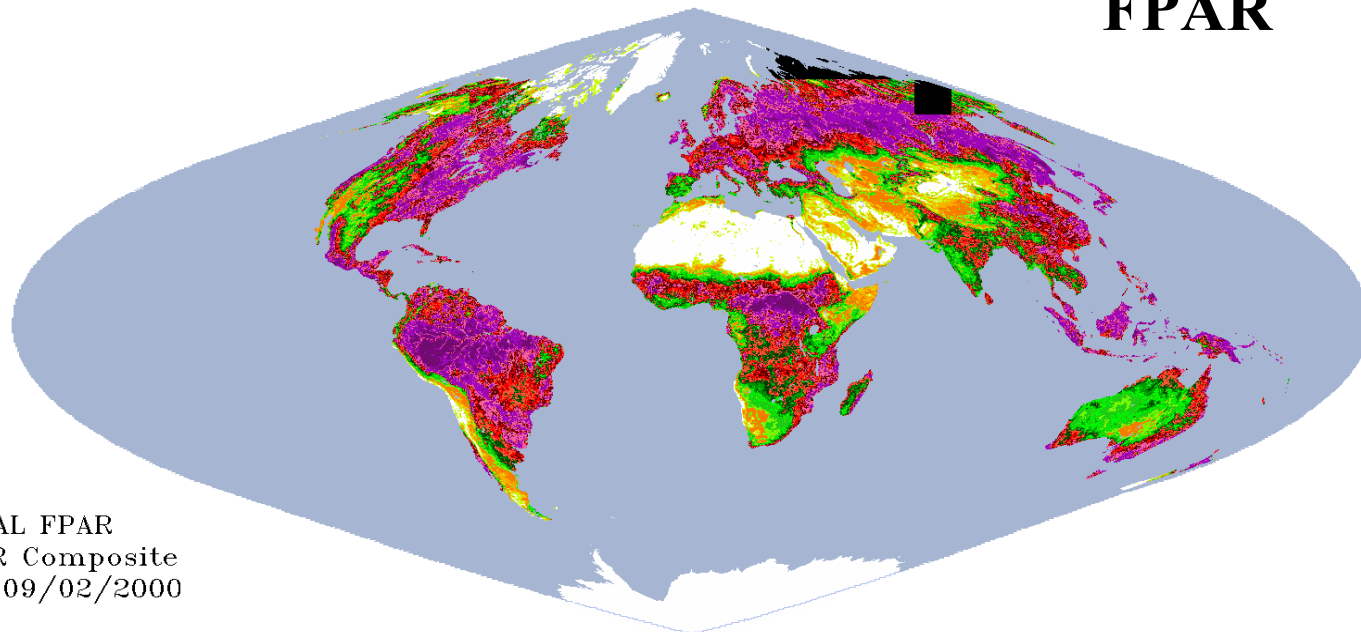
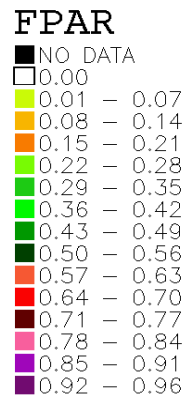




**MODIS  
LAI**

MOD15A2 Global LAI  
Composited on maximum FPAR  
06/08/2000 — 09/04/2000

**MODIS  
FPAR**



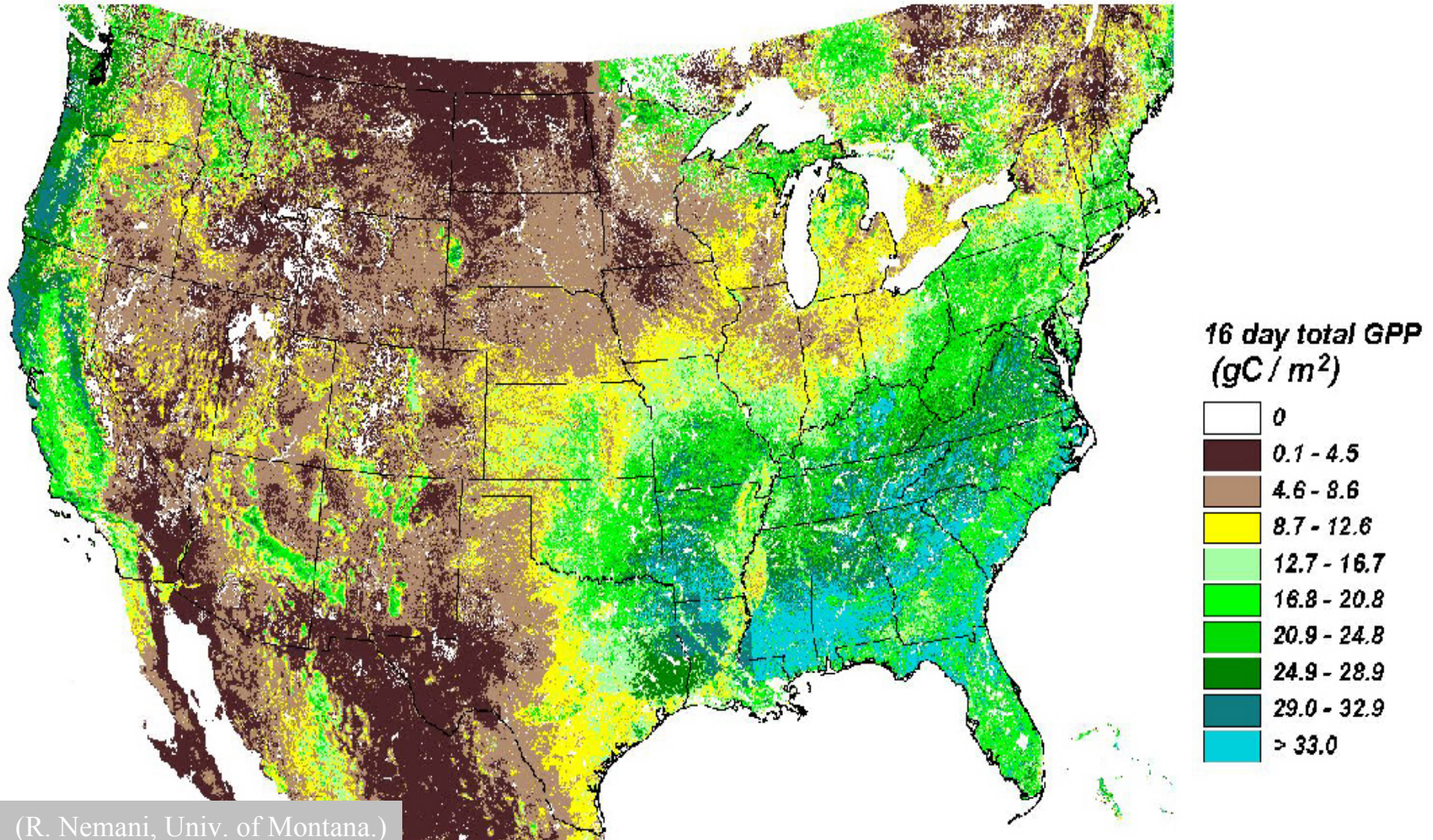
MOD15A2 GLOBAL FPAR  
Maximum FPAR Composite  
06/08/2000 — 09/02/2000



# MODIS

## Gross Primary Productivity

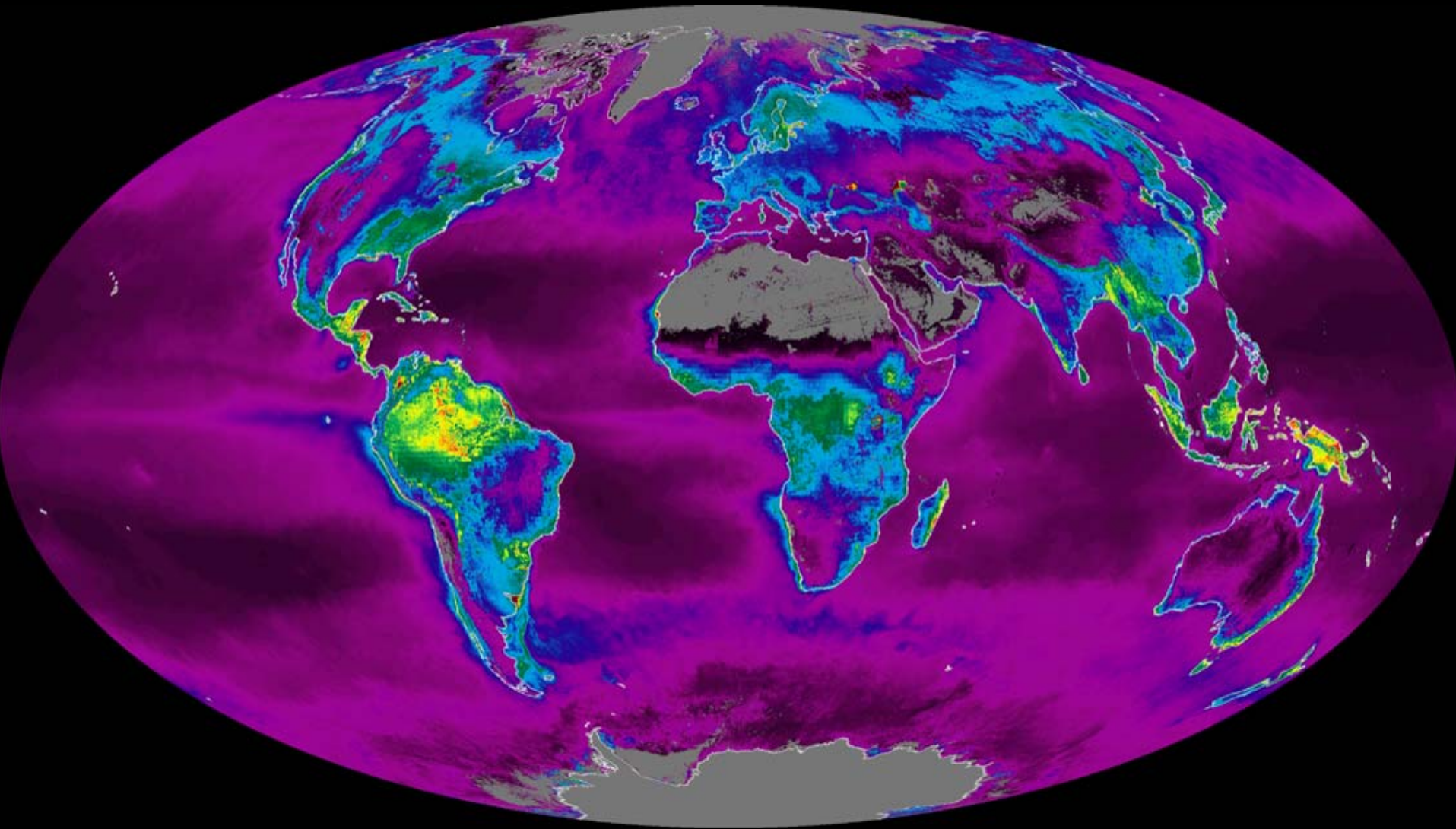
March 26 – April 10 2000





MODIS

# Global Net Primary Productivity 2002



(MODIS Science Team.)

# MODIS Product Suites

- *Energy Balance Product Suite*
  - Surface Reflectance
  - Land Surface Temperature
  - BRDF/Albedo
  - Snow Cover
- *Vegetation Parameters Suite*
  - Vegetation Indices
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  - Vegetation Cover Change
  - Fire and Burned Area



# MODIS Global 1-km Land Cover

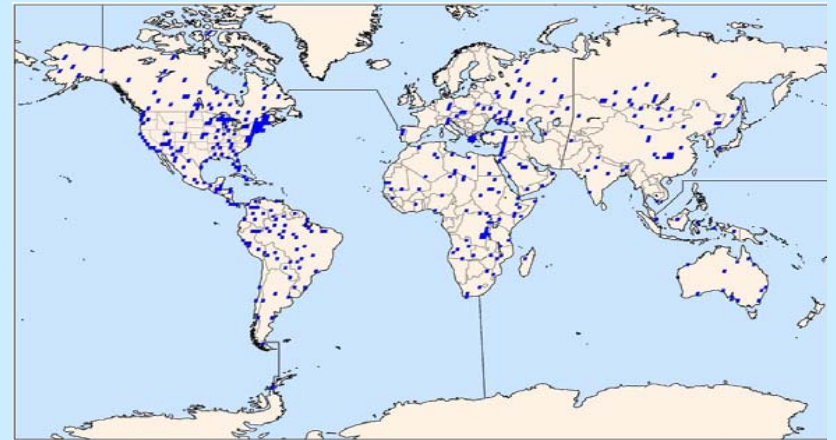
## *Inputs*

### Primary:

View-angle corrected (nadir) surface reflectance (NBAR), 7 land bands

### Ancillary:

Spatial Texture from 250-m;  
enhanced vegetation index; snow  
cover; land surface temperature;  
directional information



**test sites for training**

## *Outputs*

IGBP 17 classes, UMd 14-classes; LAI/FPAR 6 Biomes; BGC 6 Biomes

Classification Confidences

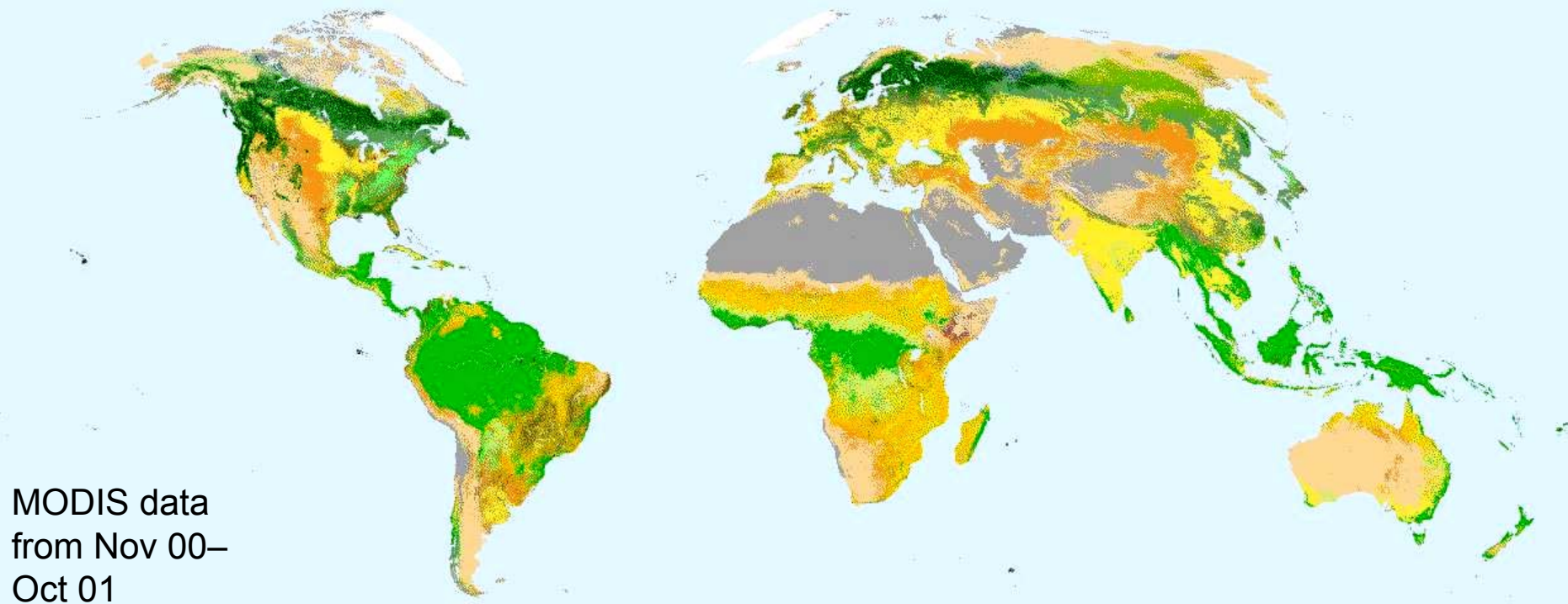
## *Approach*

Supervised approach, Artificial neural networks, Decision trees, GAM Statistical Boosting  
Global Test Sites for Training and Testing

System for Terrestrial Ecosystem Parameterization ( 920 sites ) – site labeling

# Consistent Year Land Cover Product

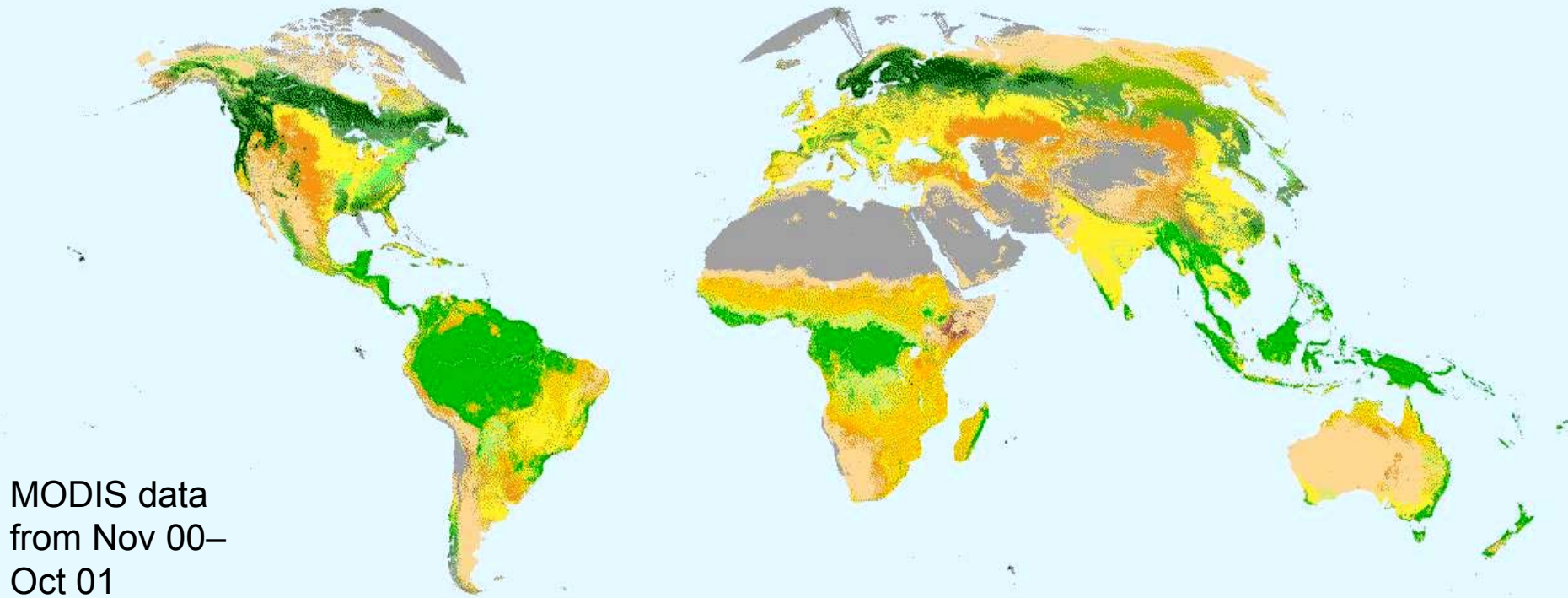
## June 02—IGBP



IGBP Land Cover Classes

 0 Water	 6 Closed Shrublands	 12 Croplands
 1 Evergreen Needleleaf Forest	 7 Open Shrublands	 13 Urban and Built-Up
 2 Evergreen Broadleaf Forest	 8 Woody Savannas	 14 Cropland/Natural Vegetation Mosaic
 3 Deciduous Needleleaf Forest	 9 Savannas	 15 Snow and Ice
 4 Deciduous Broadleaf Forest	 10 Grasslands	 16 Barren or Sparsely Vegetated
 5 Mixed Forests	 11 Permanent Wetlands	 254 Unclassified

# Consistent Year Land Cover Product June 02—UMd



UMD Land Cover Classes

0 Water	5 Mixed Forests	10 Grasslands
1 Evergreen Needleleaf Forest	6 Closed Shrublands	12 Croplands
2 Evergreen Broadleaf Forest	7 Open Shrublands	13 Urban and Built-Up
3 Deciduous Needleleaf Forest	8 Woody Savannas	16 Barren or Sparsely Vegetated
4 Deciduous Broadleaf Forest	9 Savannas	254 Unclassified



# Consistent Year Land Cover Product June 02— LAI/fPAR Biomes

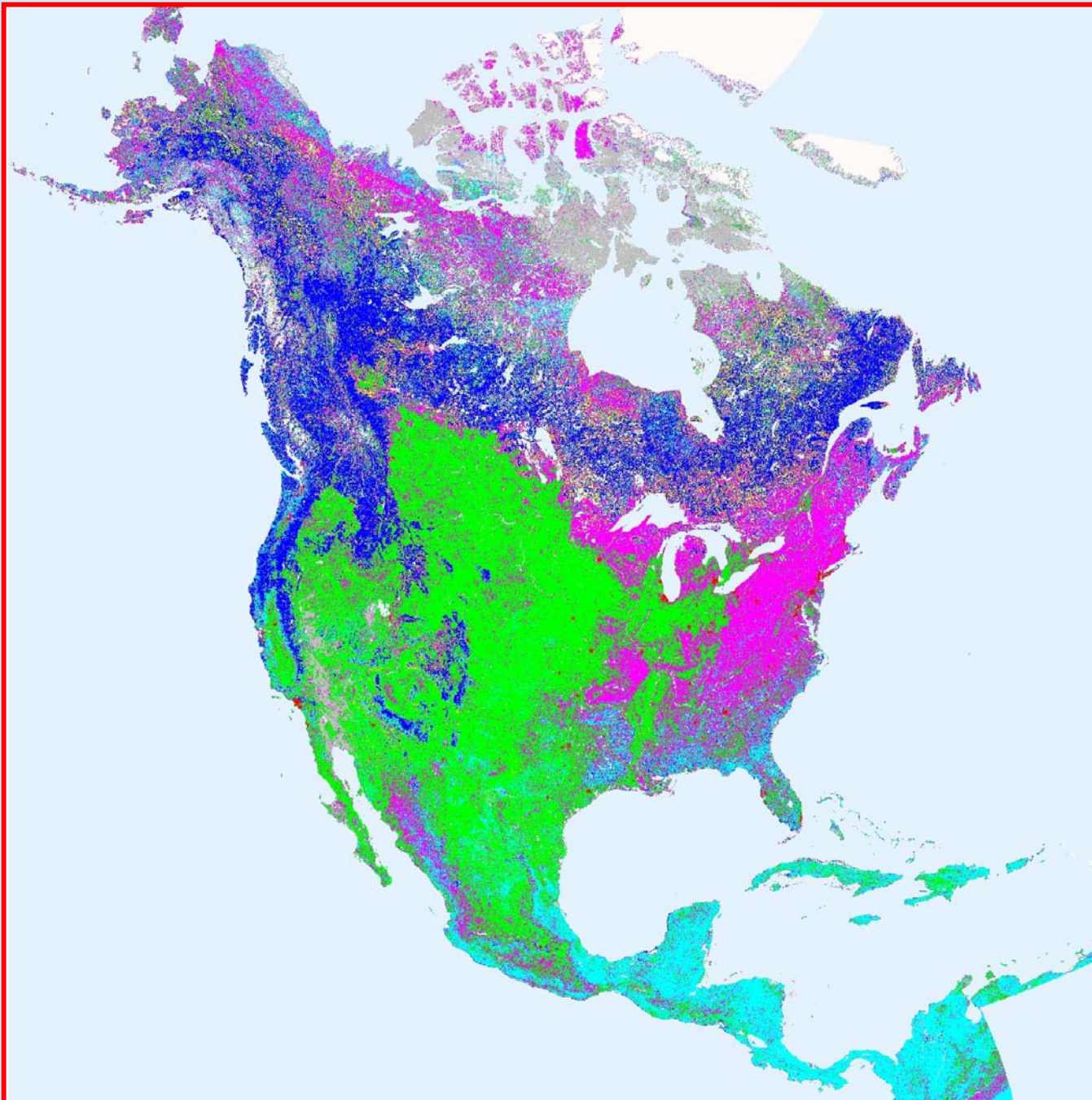
MODIS data  
from Nov 00—  
Oct 01

LAI/fPAR Biome Classes

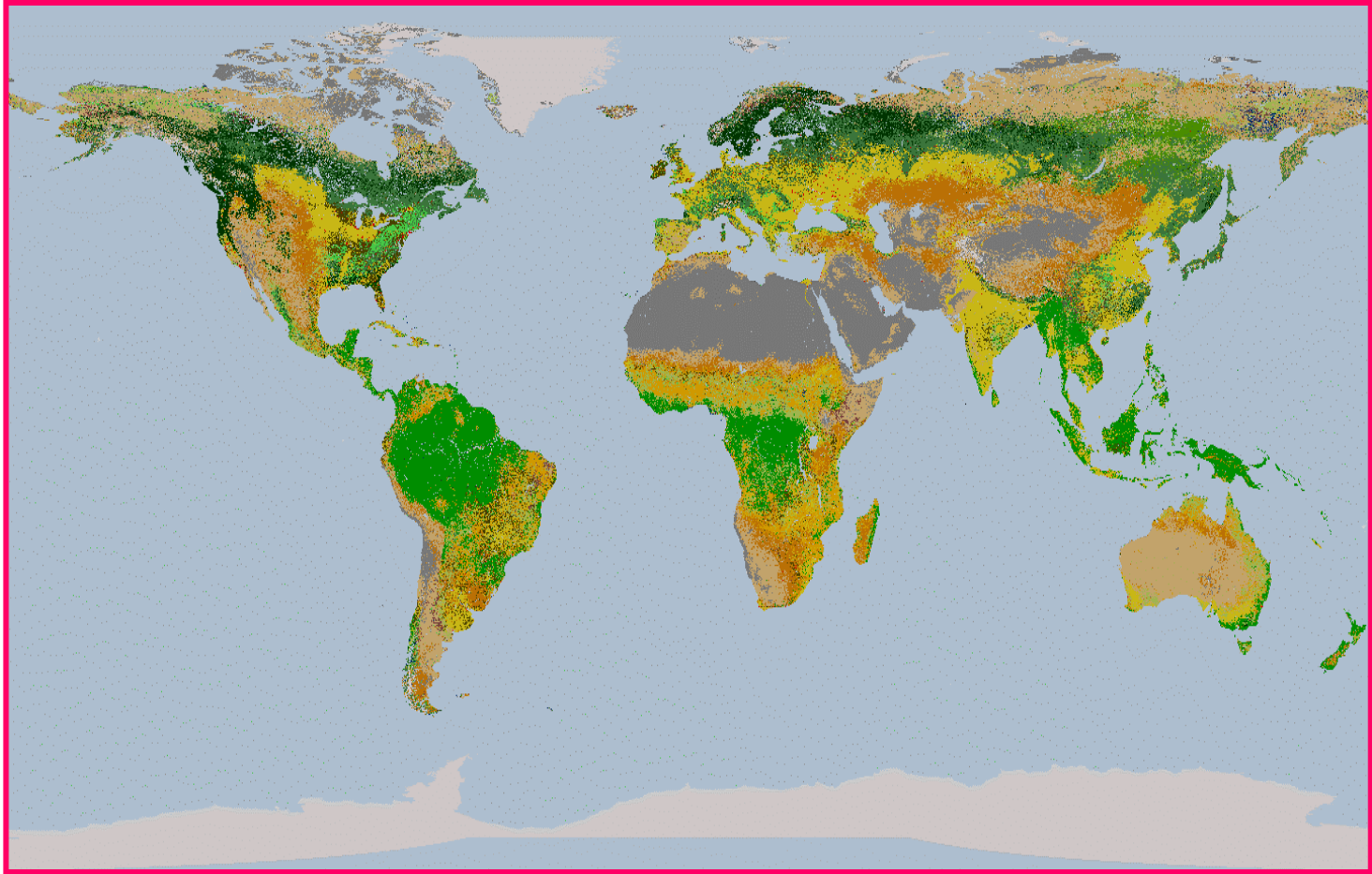


# Biome-BGC Labels

(Provisional Product)

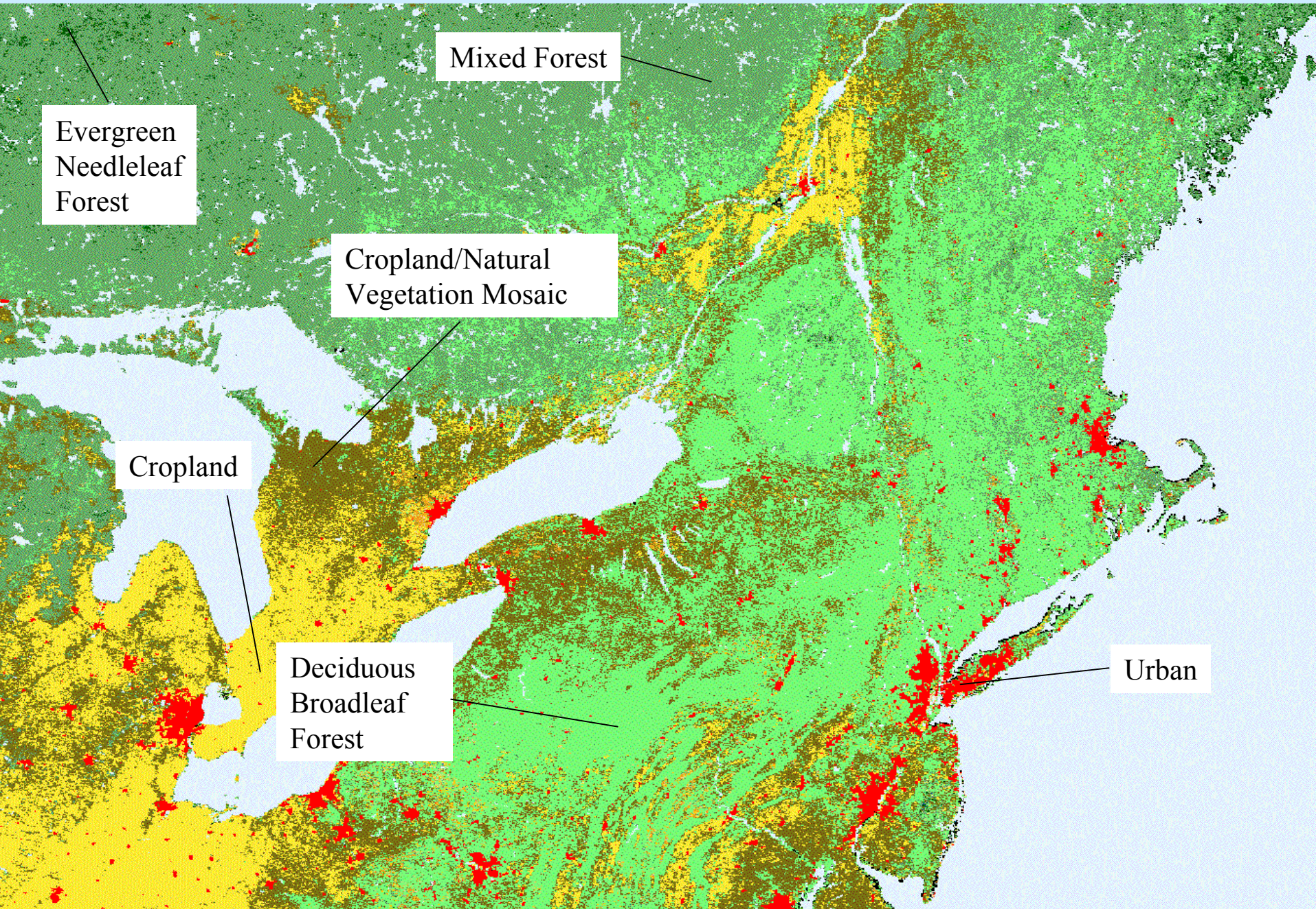


# Climate Modeling Grid (CMG)



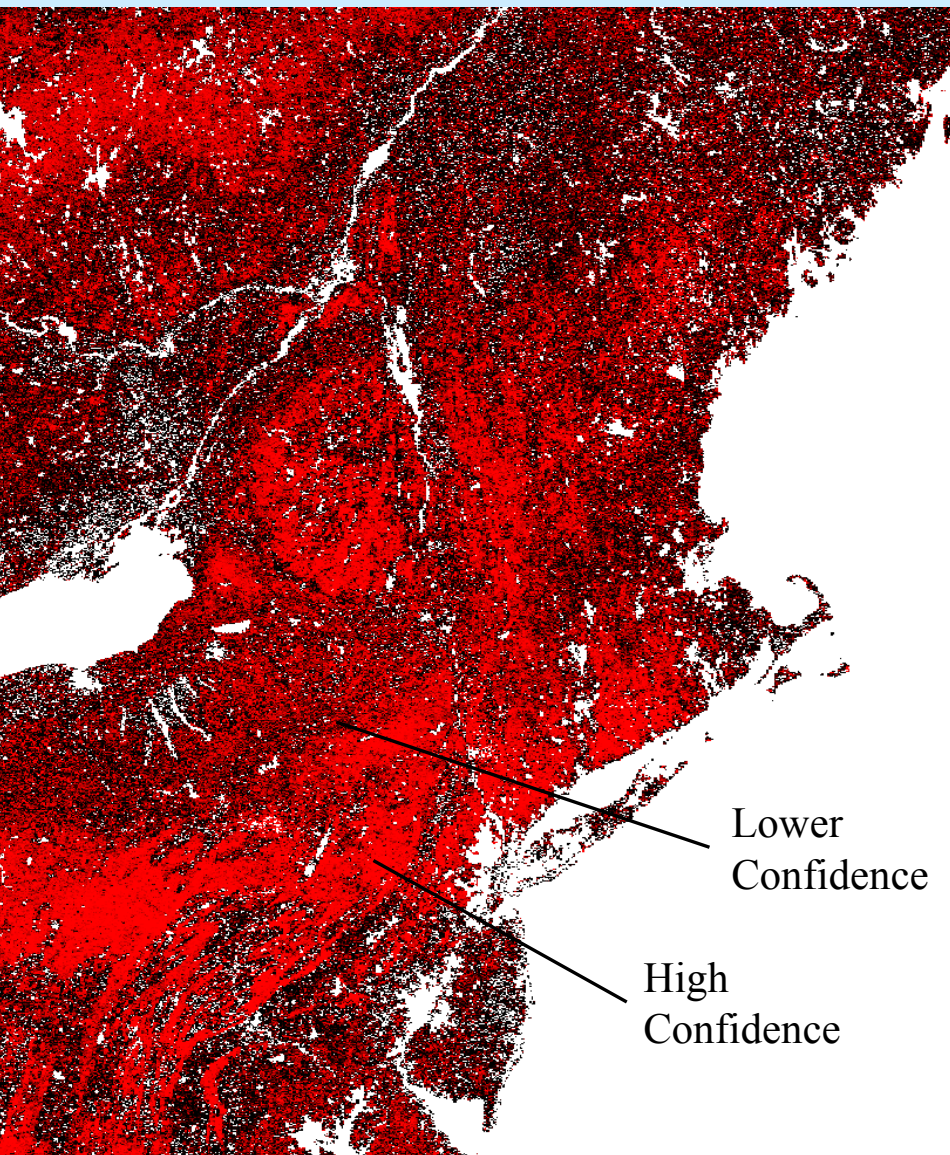


# Consistent Year Land Cover Product, Nov 00–Oct 01

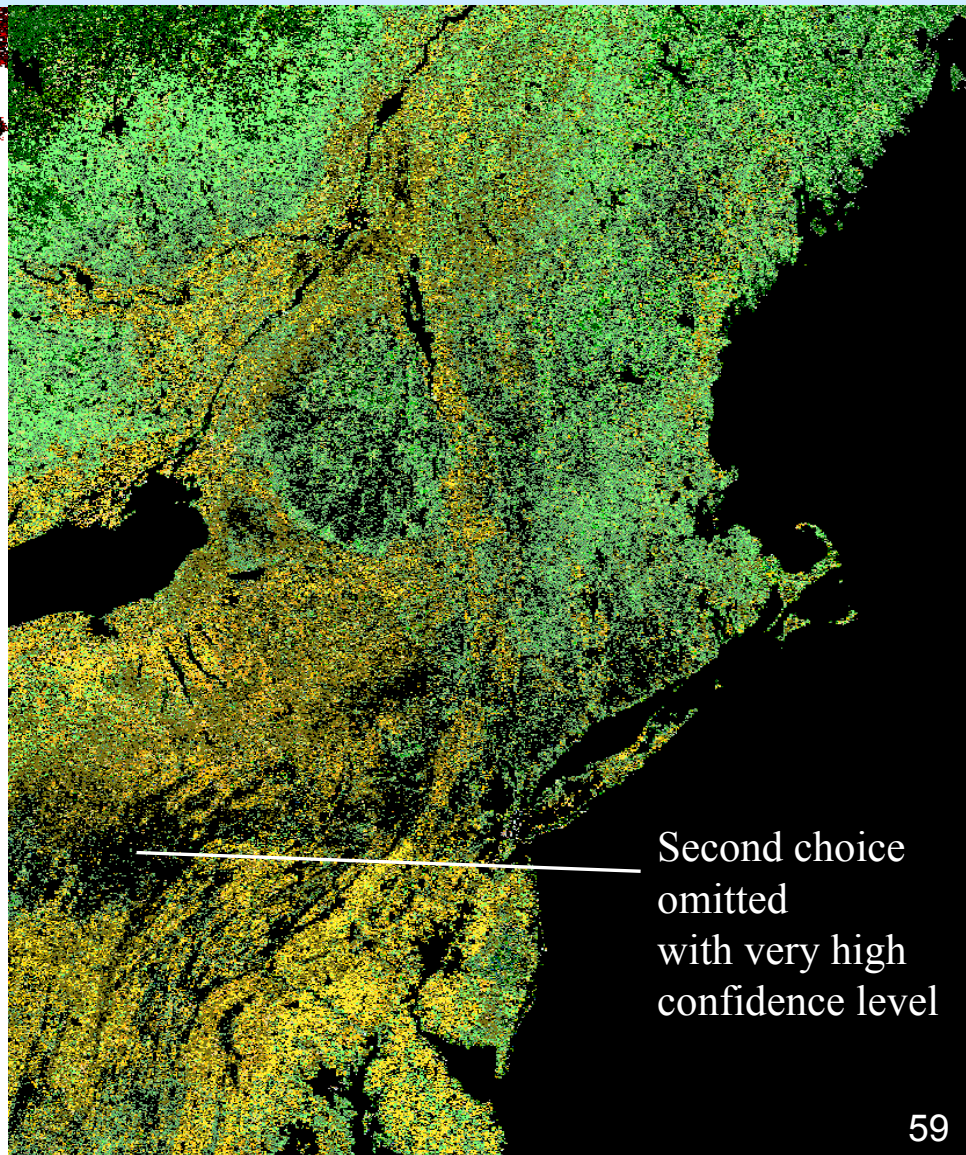




## Classification Confidence Map



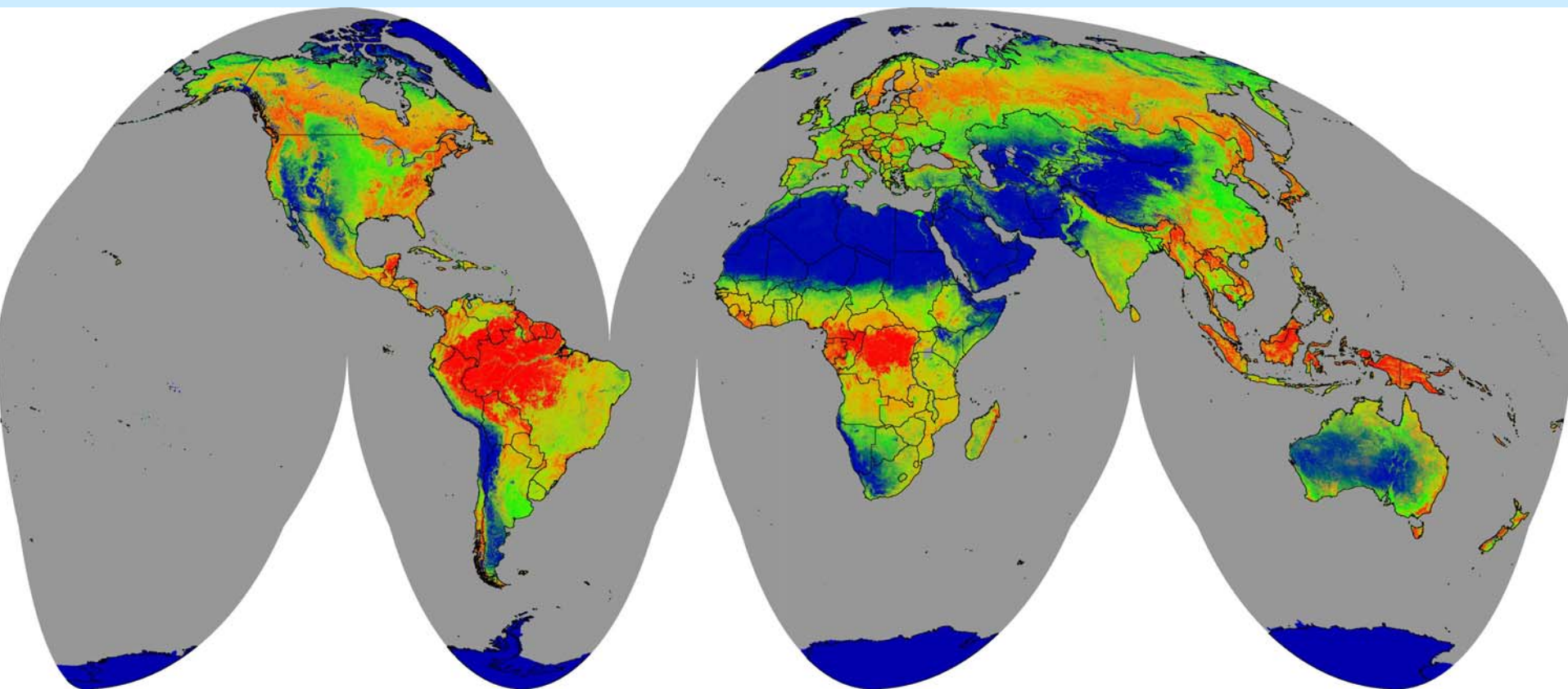
## Second Most-Likely Class





# MODIS

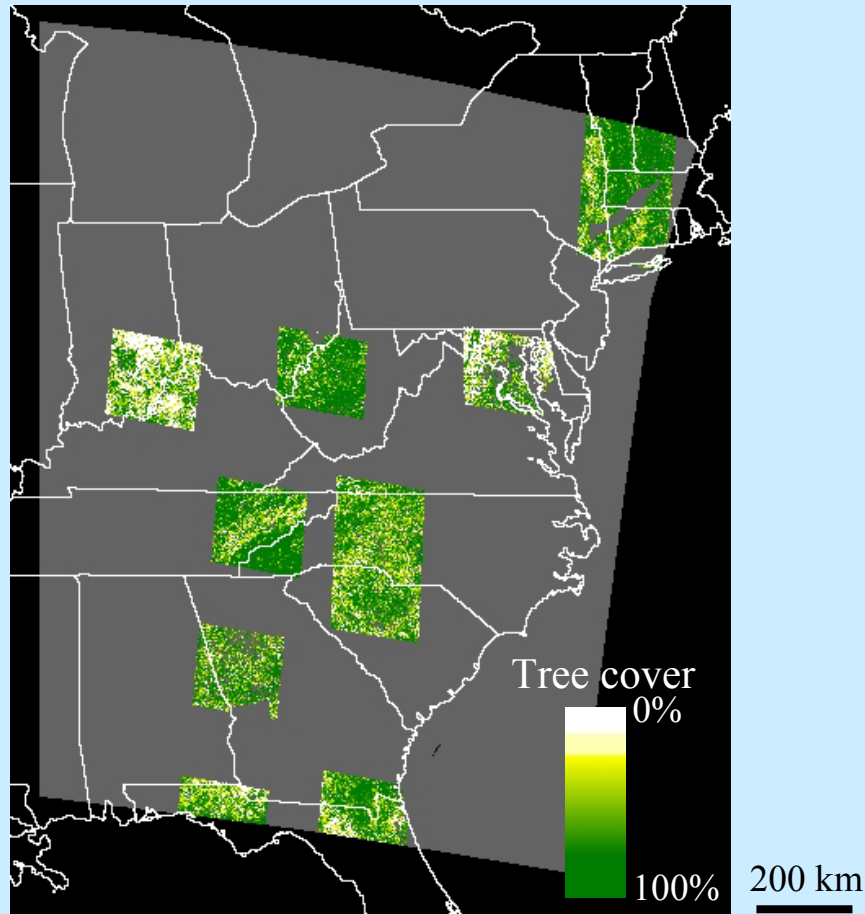
## Vegetation Continuous Fields



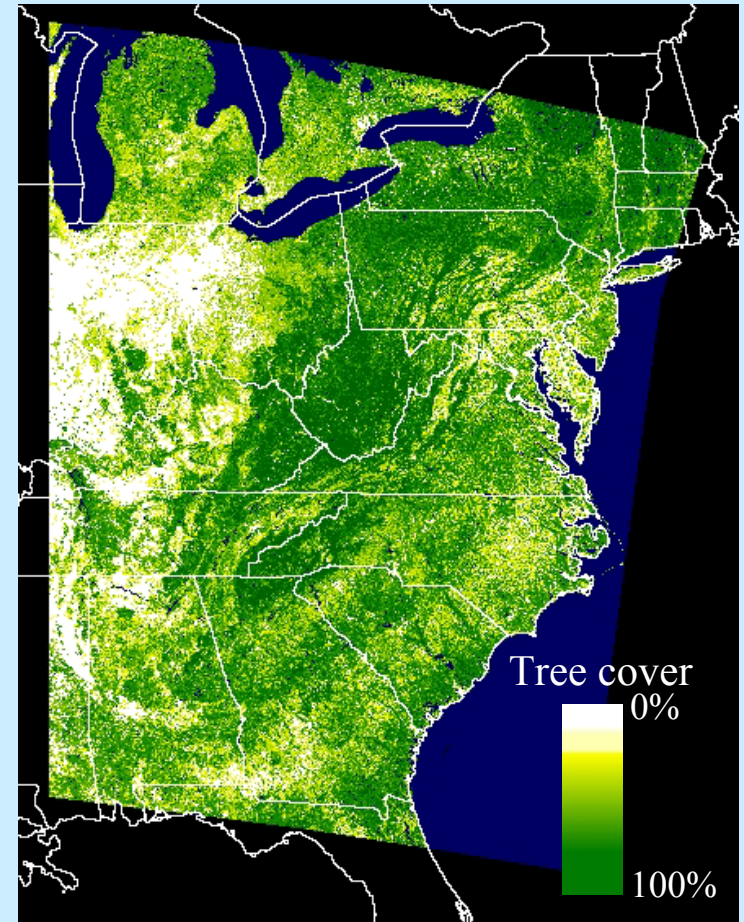


# MODIS Continuous Fields Product

## Training data and tree cover product

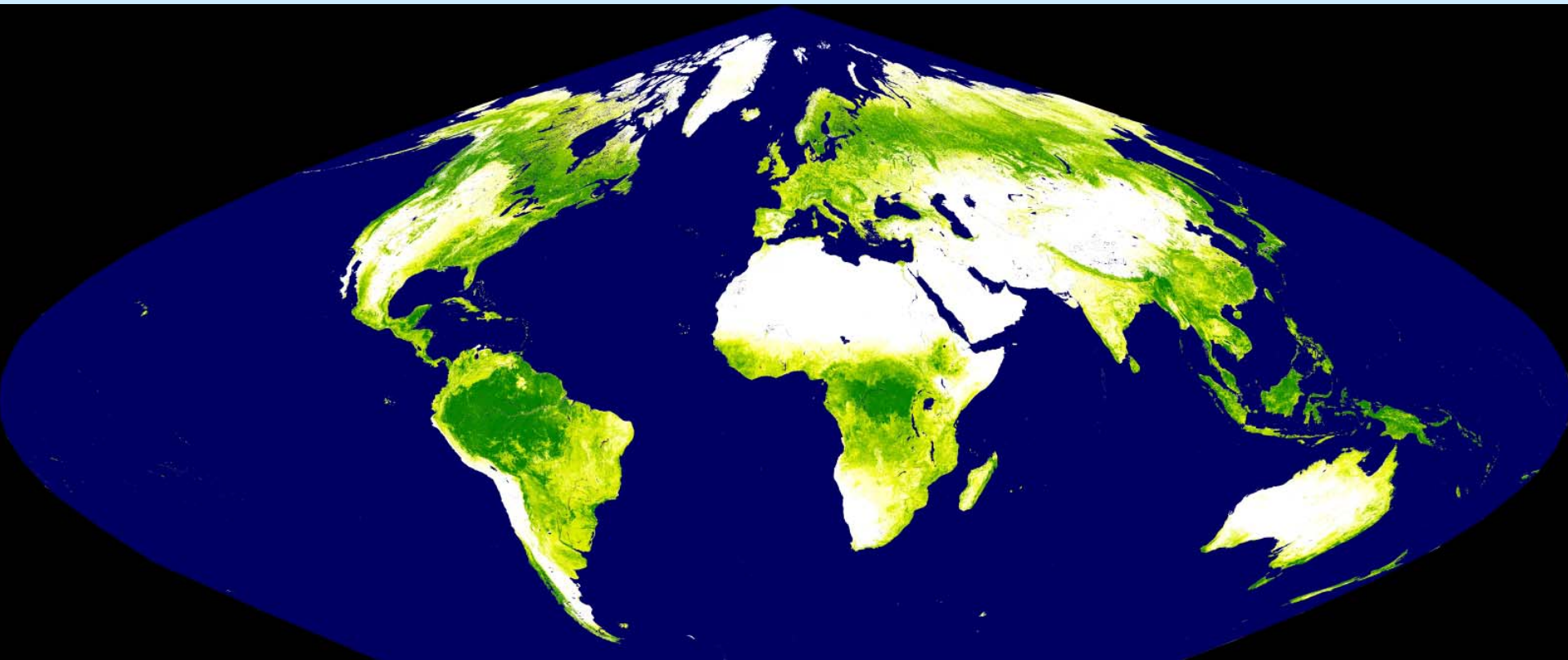


250 meter tree cover training data  
from high-resolution classified images



Algorithm output

# MODIS 500 meter global percent forest cover for 2000

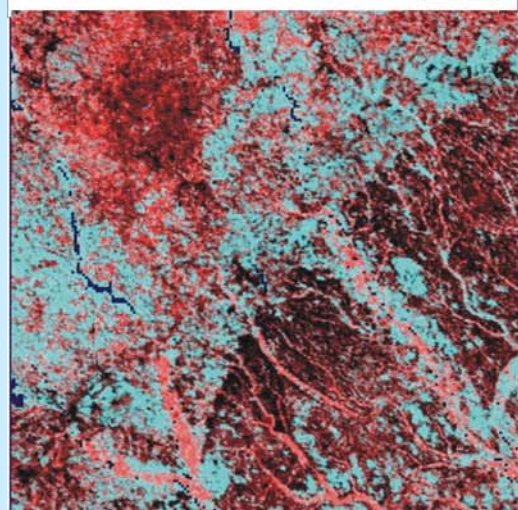
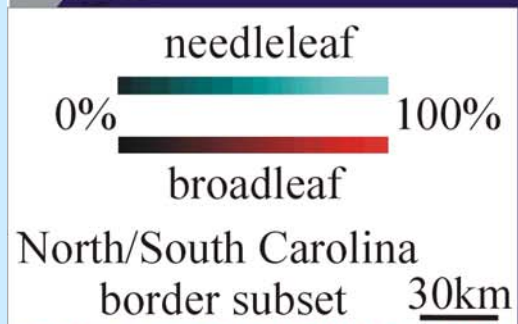


% tree cover





North America  
500 meter MODIS  
continuous field  
of leaf type



600 km





# Types of Land Cover Change of Concern for the Vegetative Cover Conversion product



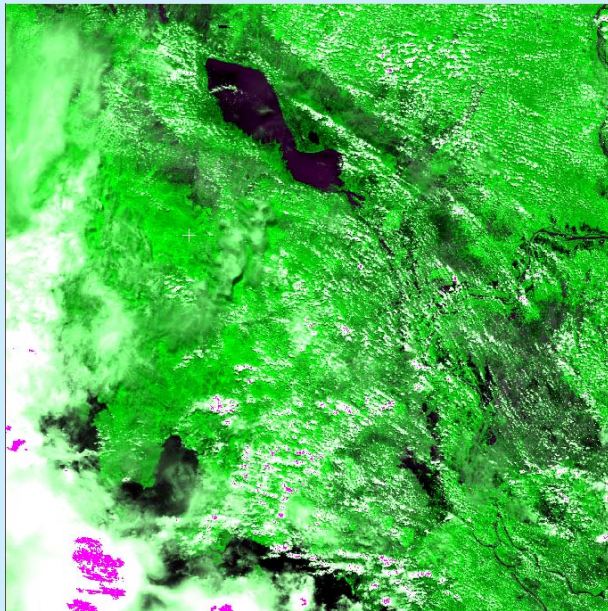
<b>To</b> <b>From</b>	Forest	Non-Forest	Bare	Water	Burn Scar
Forest	-	Deforest.	Deforest.	Flooding	Burn
Non-Forest	Regrowth	-	Urban.	Flooding	Burn
Bare	Regrowth	Agricul. Expansion	-	Flooding	-
Water	Flood retreat	Flood retreat	Flood retreat	-	-
Burn	Regrowth	Regrowth	-	-	-



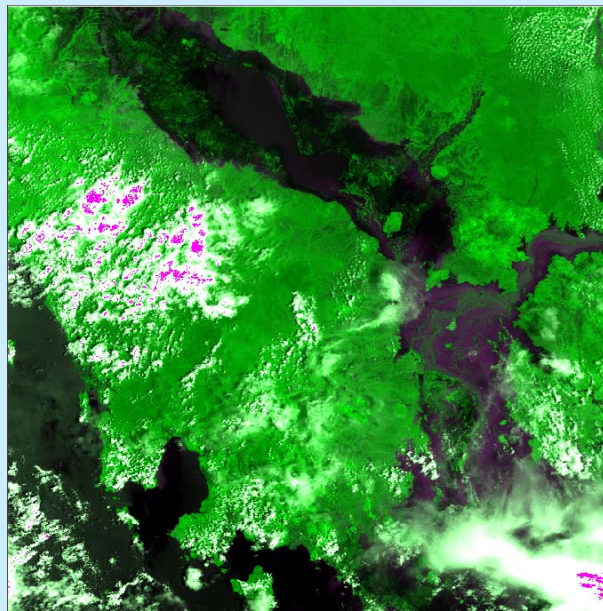
# Cambodia 2000 Flooding



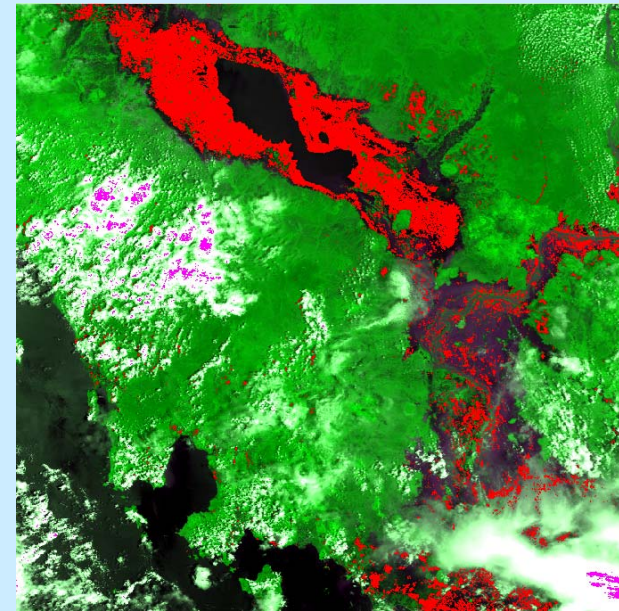
Vegetative Cover Conversion Alarm Result in Red



July 1<sup>st</sup>



September 15<sup>th</sup>



VCC

VCC identified the extent of flooding resulting from monsoonal rains near the city of Phnom Penh.

One can see where Lake Tonle Sap has expanded to the extent that by September there is open water from the interior into the Gulf of Siam.

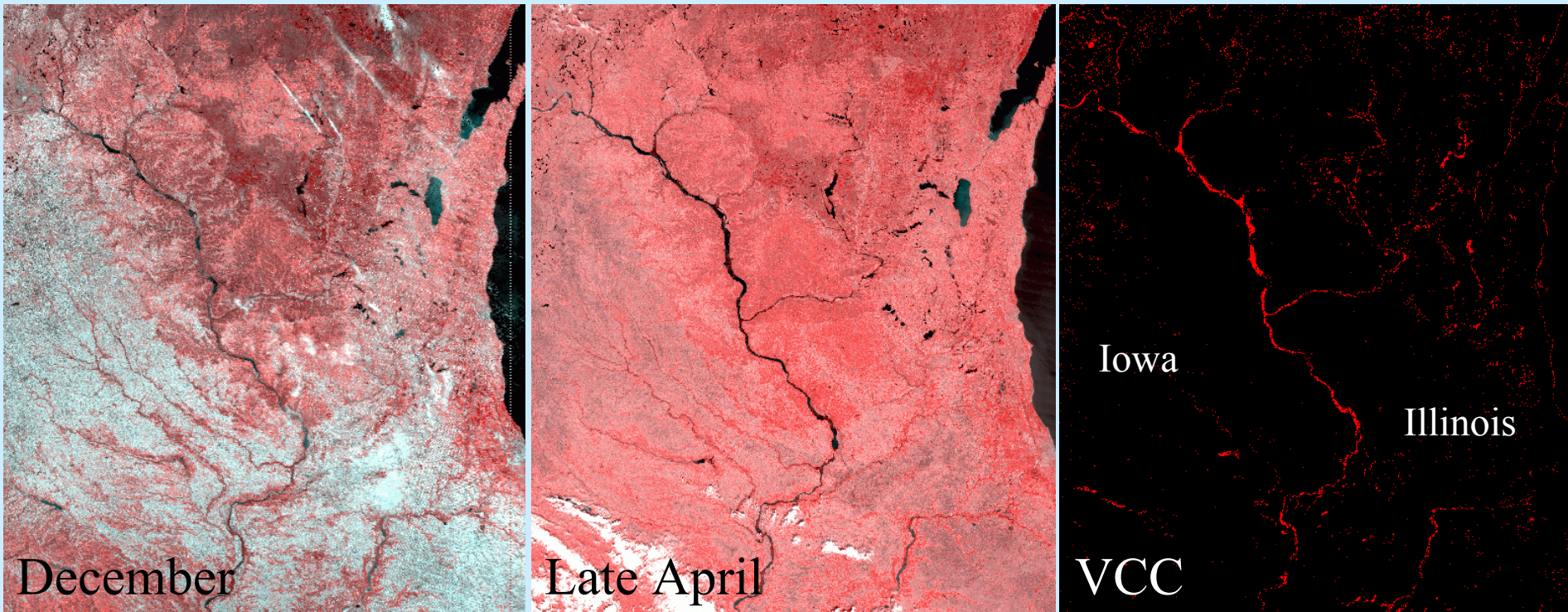




# Upper Mississippi 2000 Flooding



Vegetative Cover Conversion Alarm Result in Red



VCC identified the extent of flooding resulting from late snow melt along the upper Mississippi River.

This is the third time in less than ten years that this region has experienced major flooding

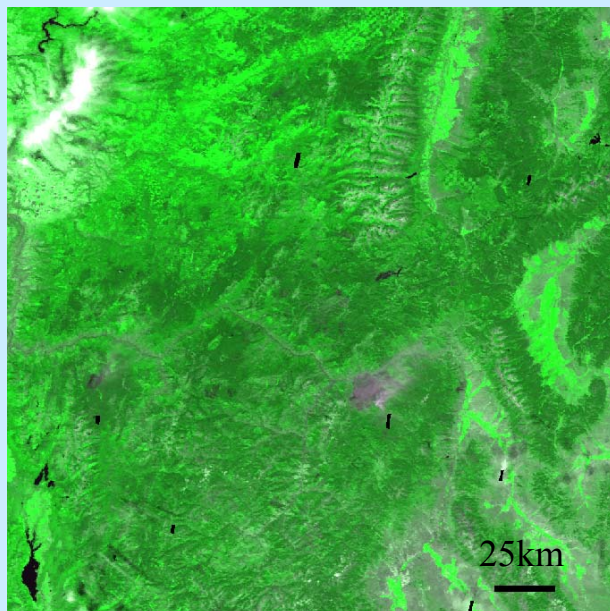




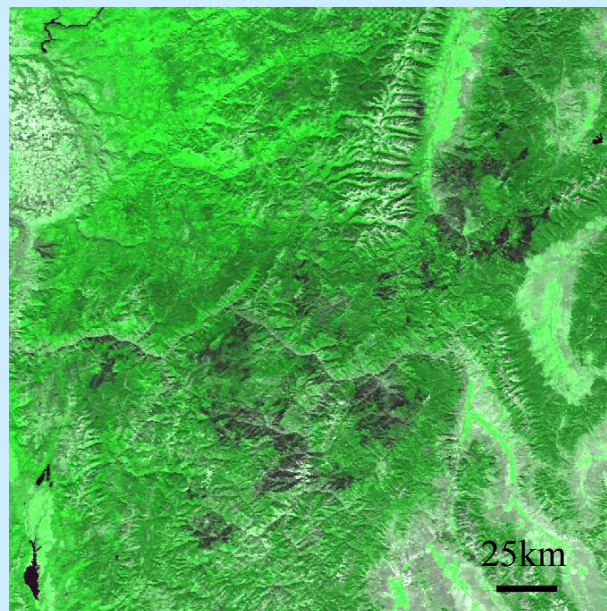
# Idaho/Montana 2000 Wildfire



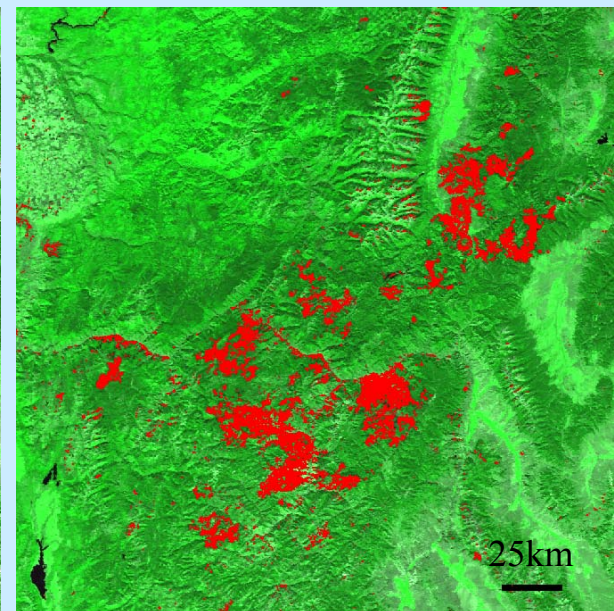
Vegetative Cover Conversion Alarm Result in Red



July 24<sup>th</sup>



September 26<sup>th</sup>



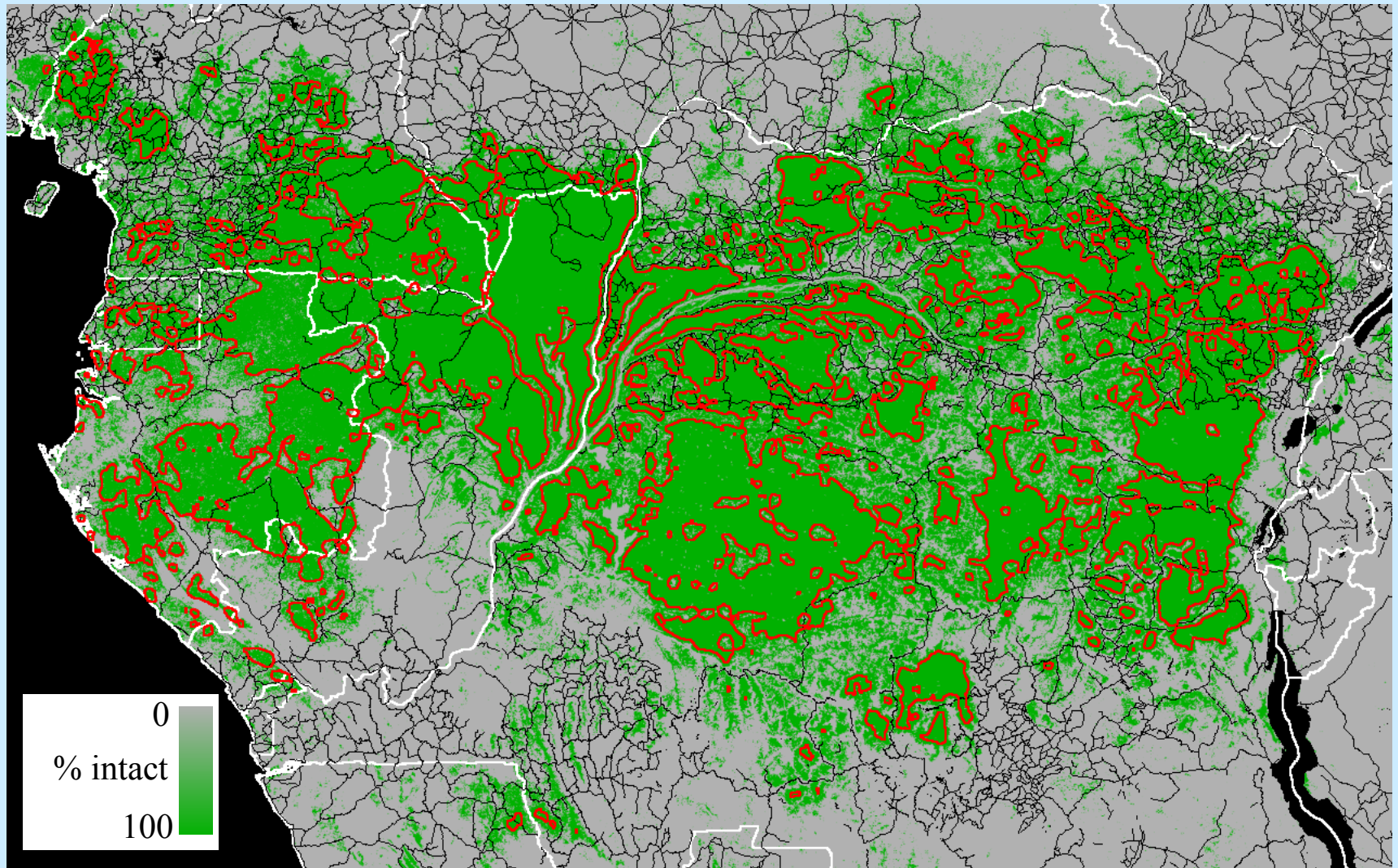
VCC

VCC identified the land cover change resulting from the Wilderness Complex, Valley Complex, Diamond Creek, and Clear Creek wildfires.

During 2001, enhanced VCC output will be used by the USDA Forest Service for their Burned Area Emergency Rehabilitation efforts.



# MODIS Intact forests of Central Africa

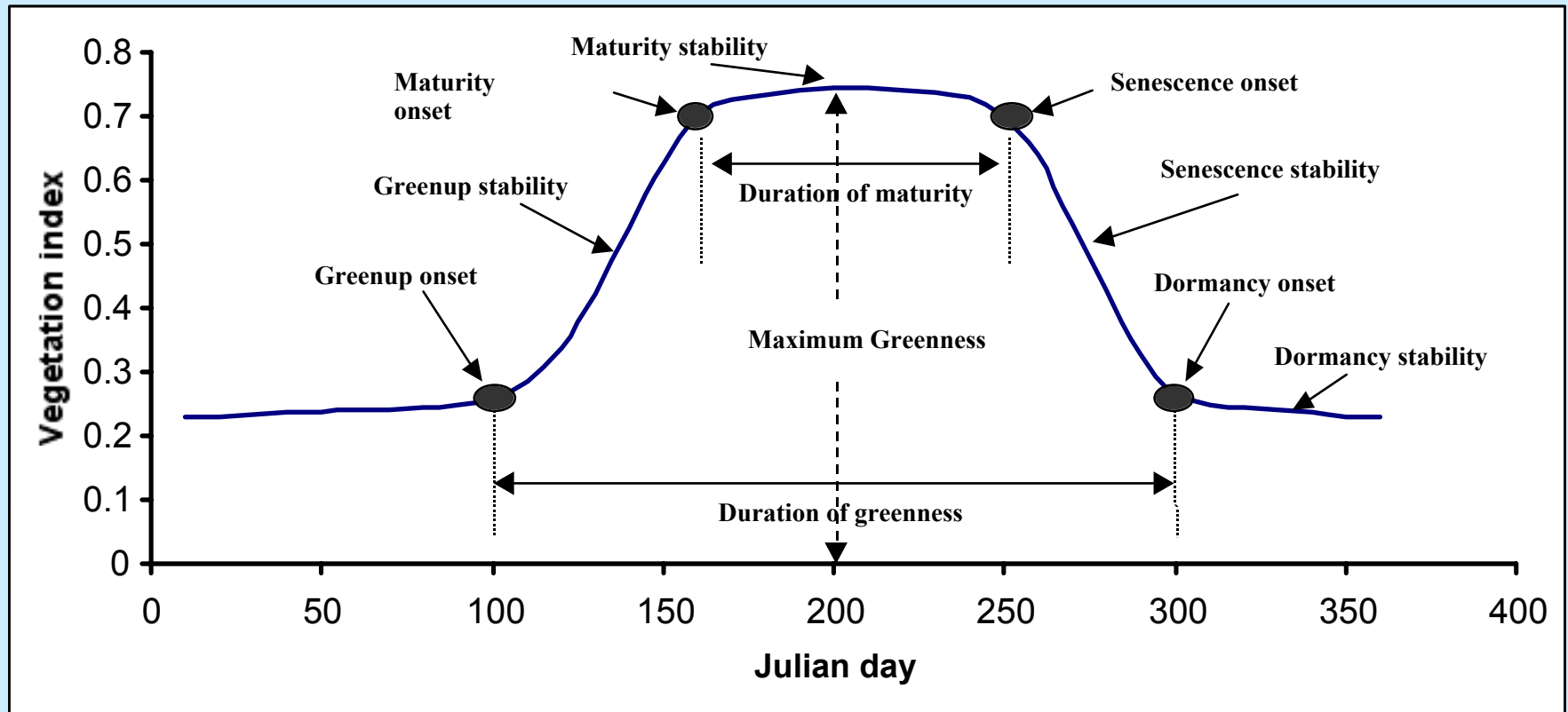


Contiguous intact forest areas greater than 500 sq. km. in size

red = outlines of intact forest tracts,  
black = road networks from NIMA,  
white = country boundaries

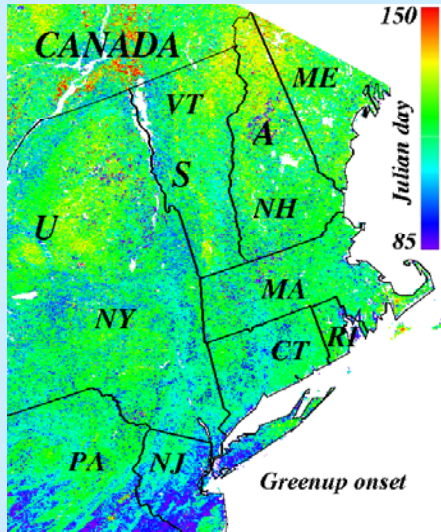
(MODIS/Townshend)

# Land Cover Dynamics: Defining Phenological Attributes

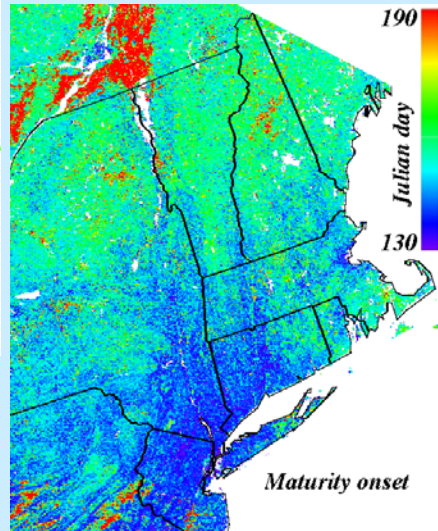




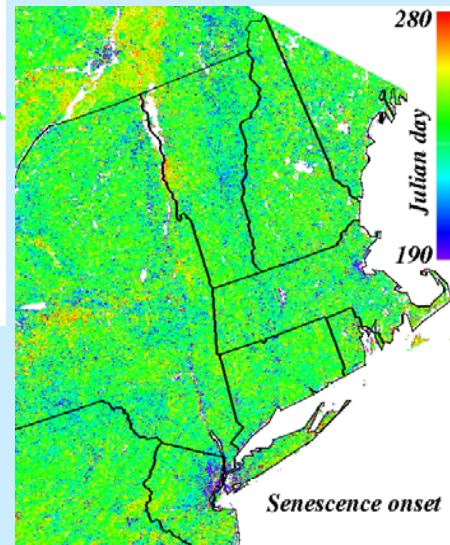
# Northeast Phenology



Greenup

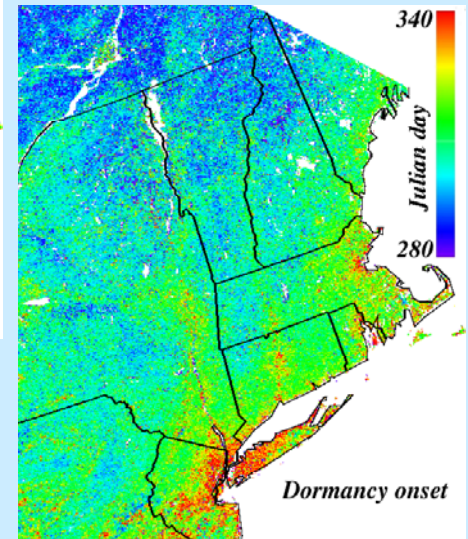


Maturity



Senescence

## Dormancy







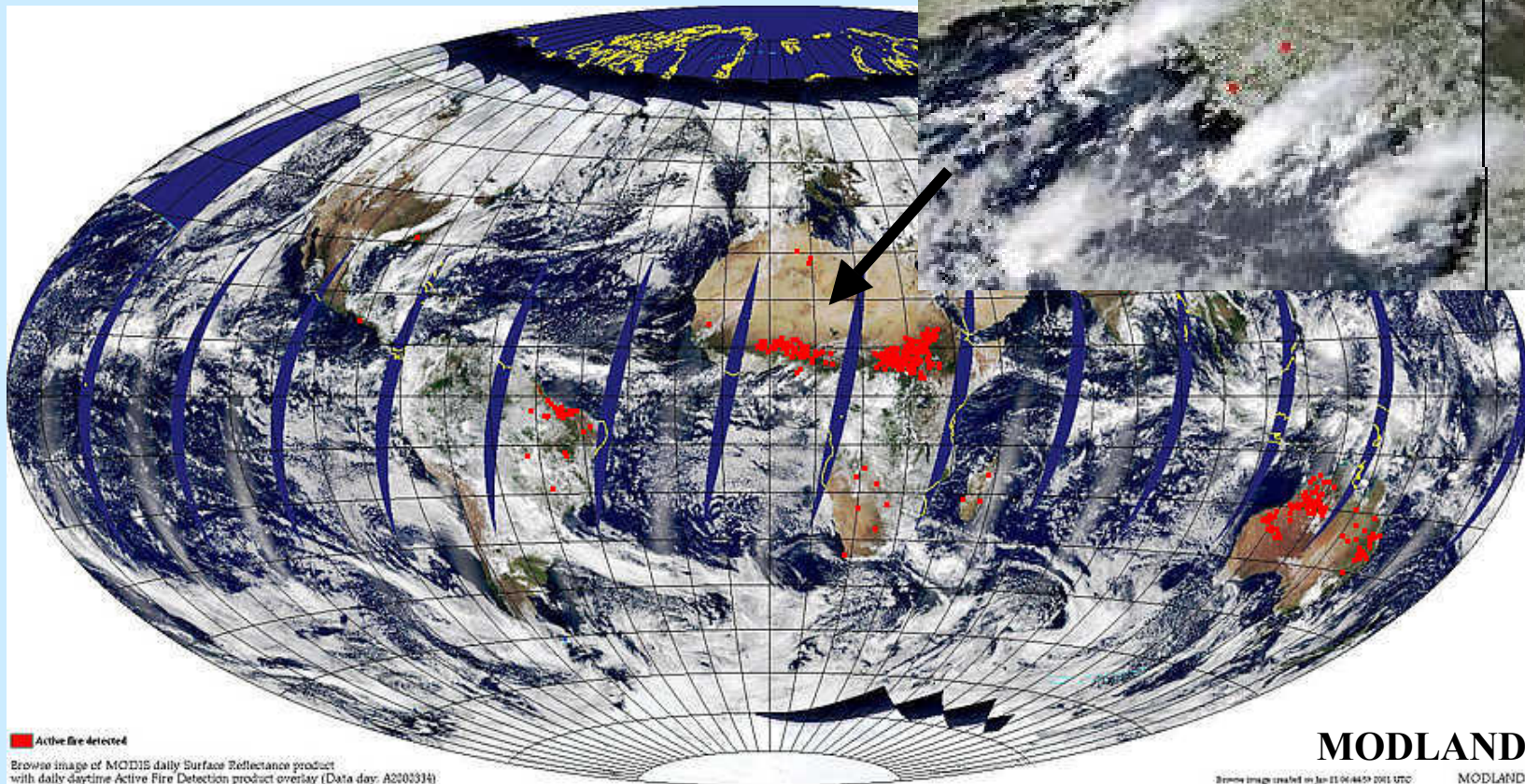


QuickTime™ and a GIF decompressor are needed to see this picture.

# MODIS Global Fire Browse

## November 29, 2000

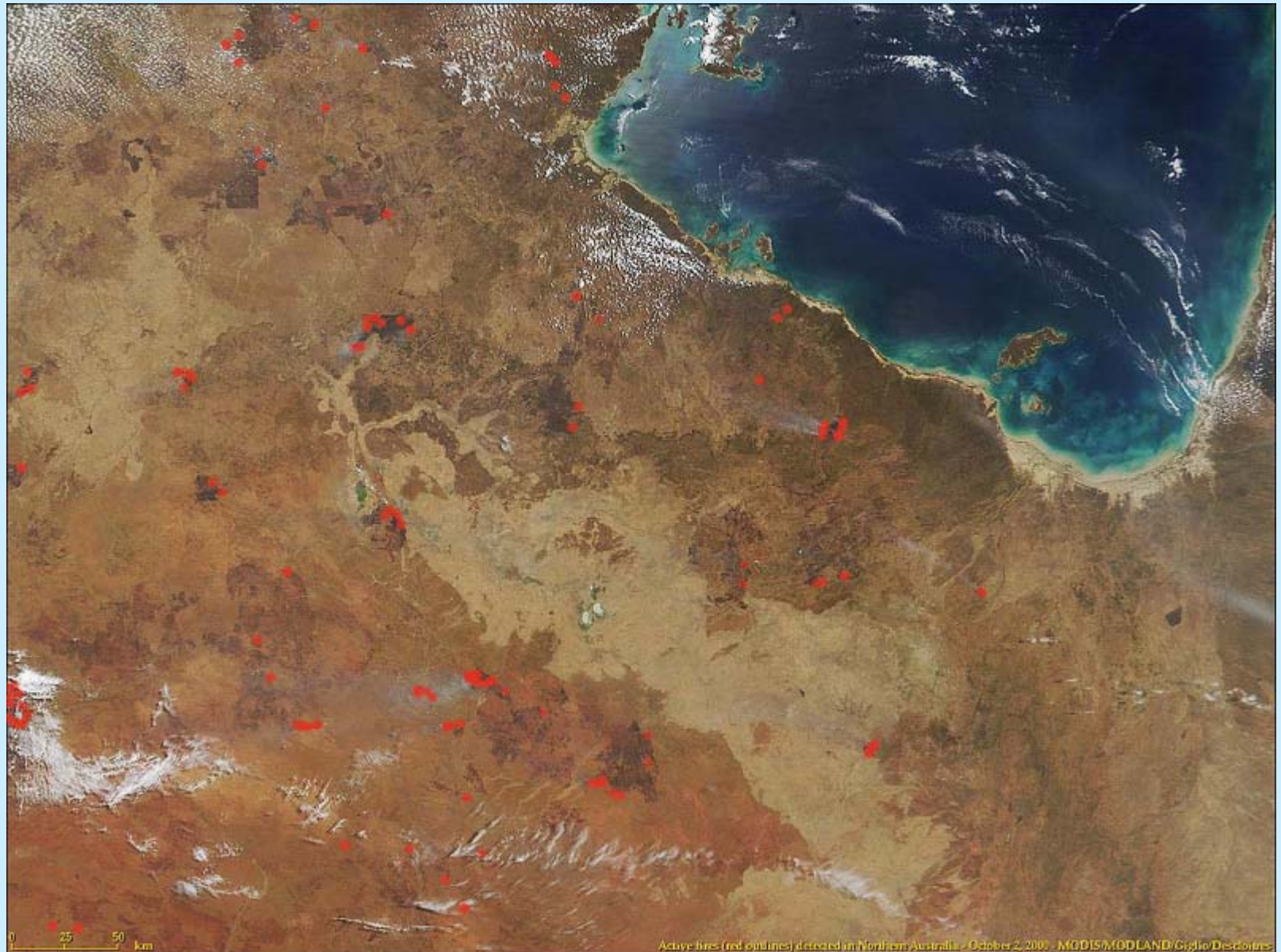
Available at 20km and 5km  
at <http://modland.nascom.nasa.gov/browse/>



**MODLAND/Justice et al**

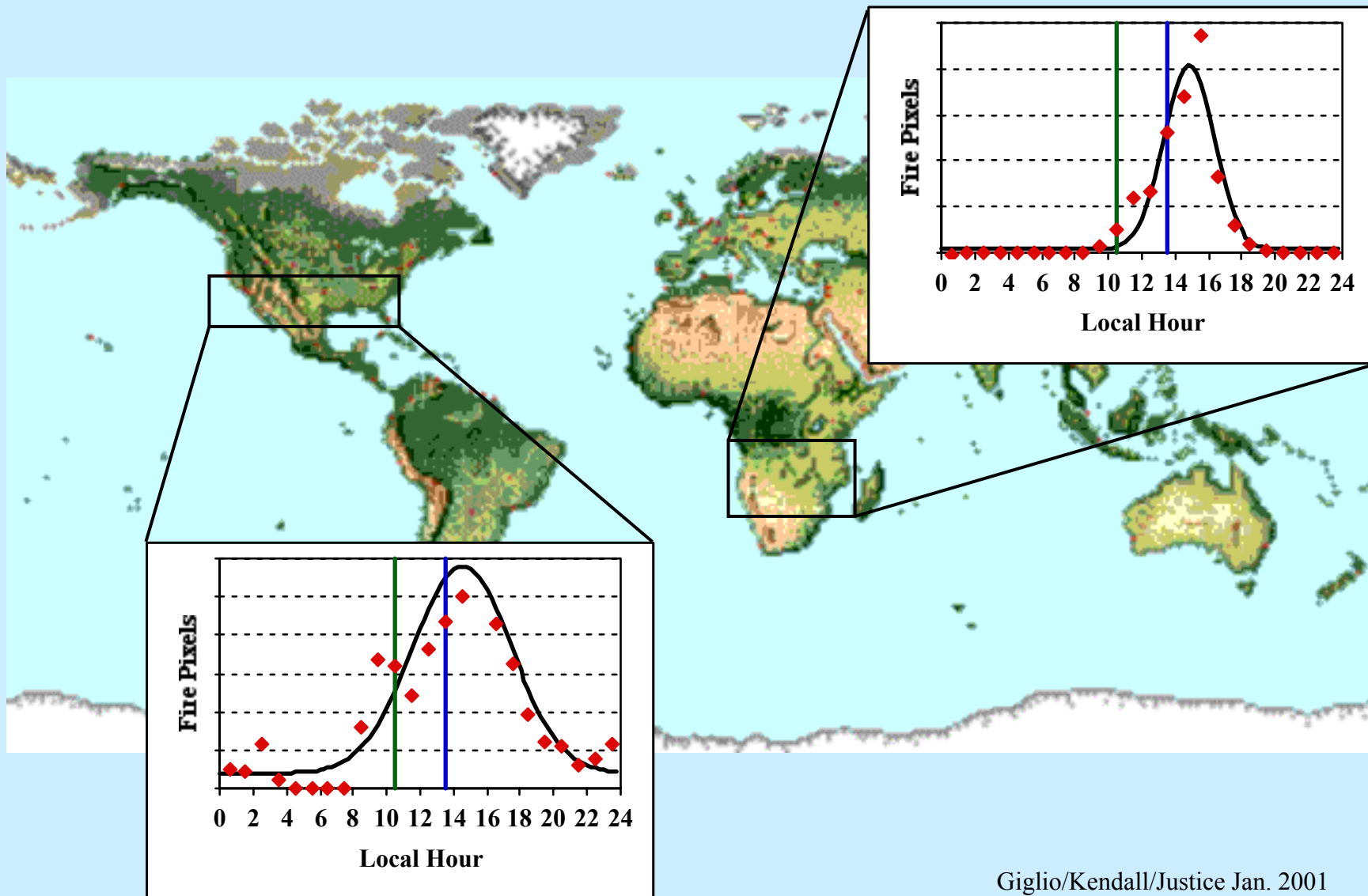


## MODIS Fires, NW Australia, Oct 2, 2000



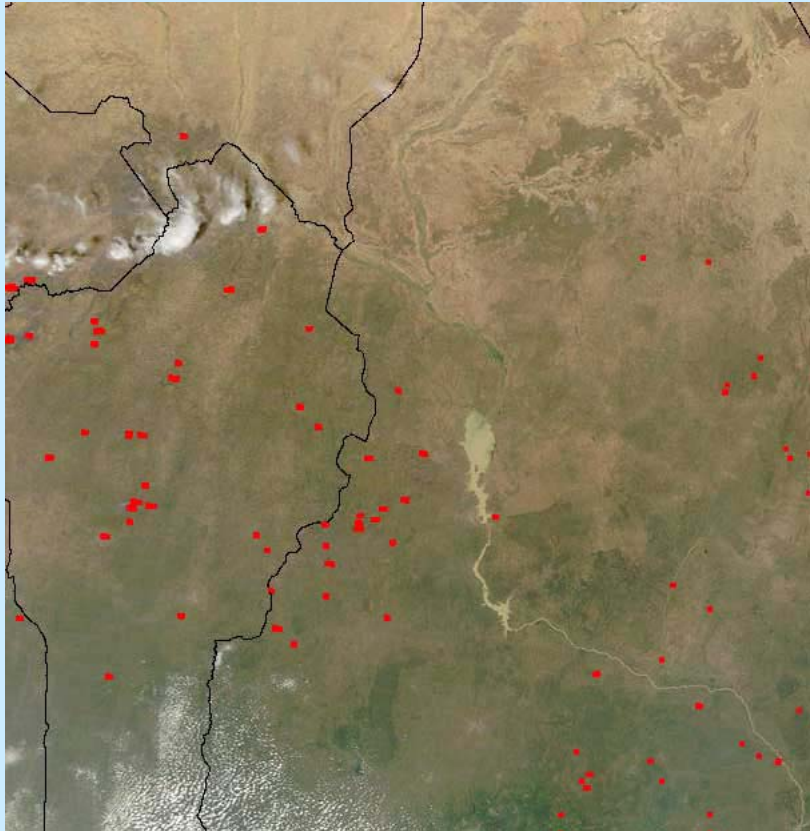


# TRMM VIRS-Derived Diurnal Burning Cycle (July)

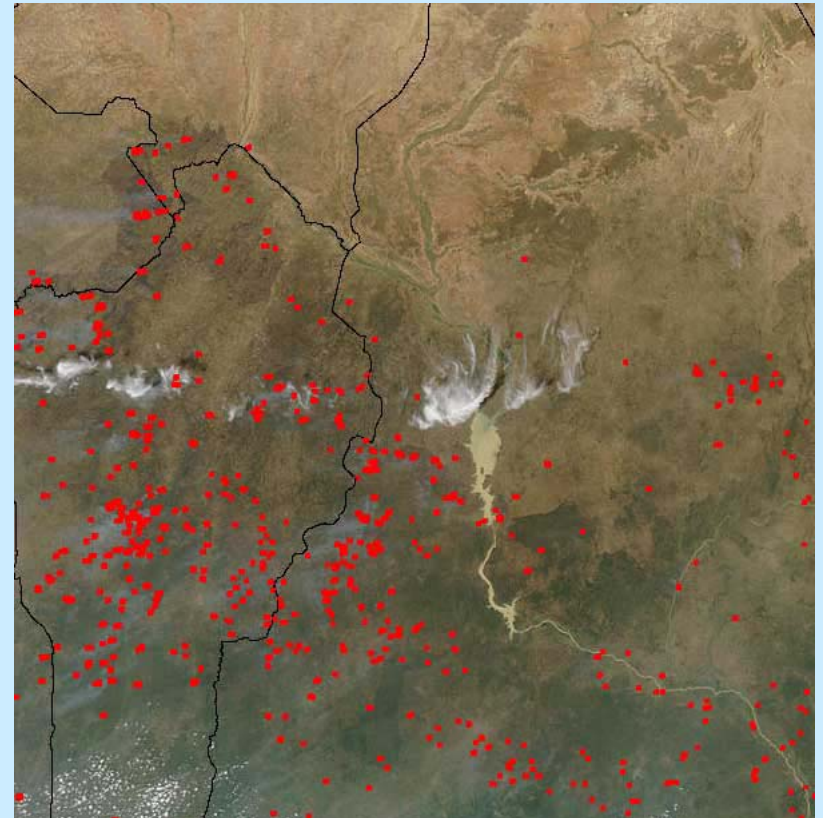


Giglio/Kendall/Justice Jan. 2001

***MODIS Terra, Aqua***  
***Benin / Nigeria, W. Africa***  
***Fire Detection***  
***November 30 2002***



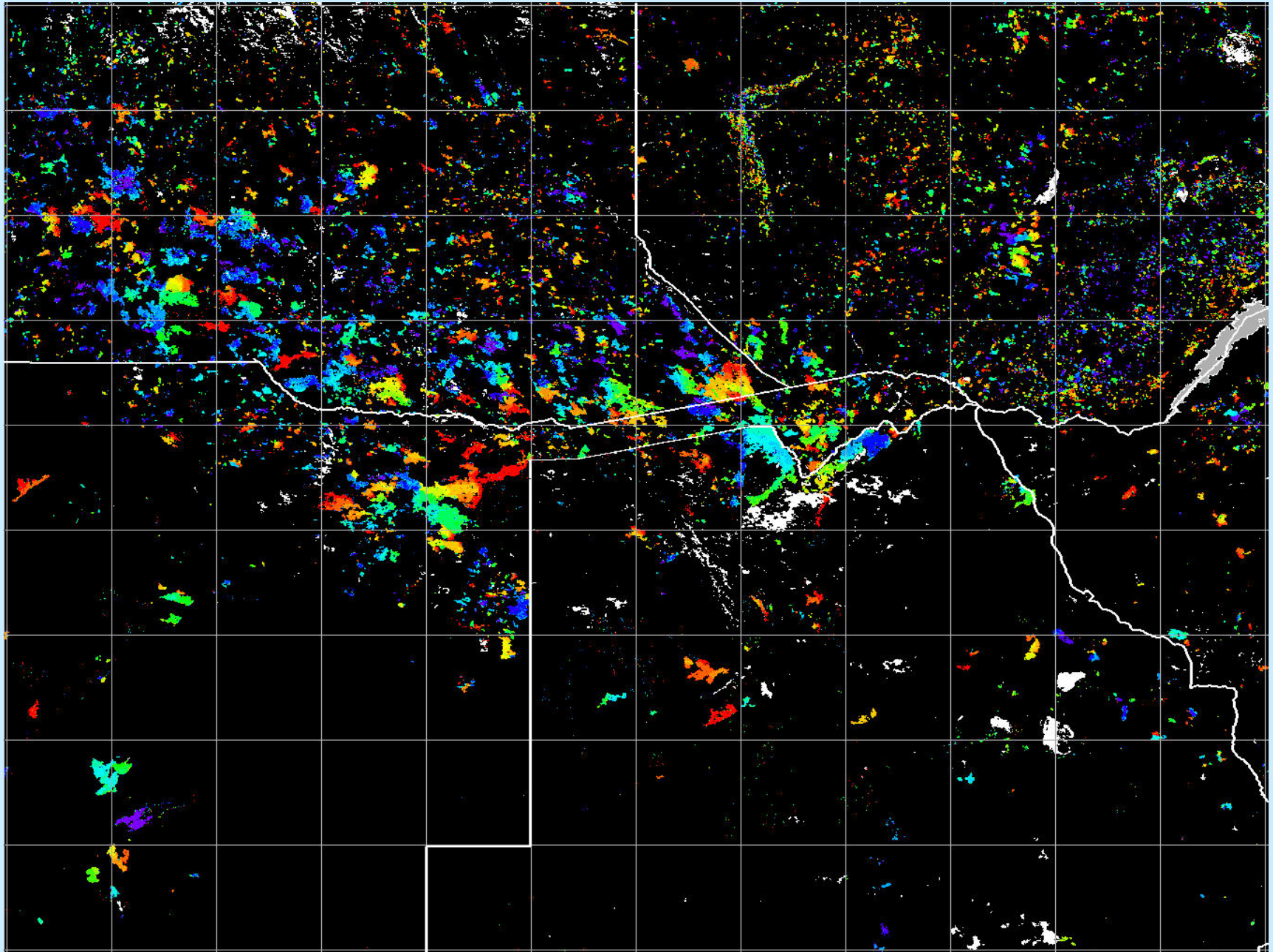
**9.55 UTC**  
**TERRA**



**12.55 UTC**  
**AQUA**

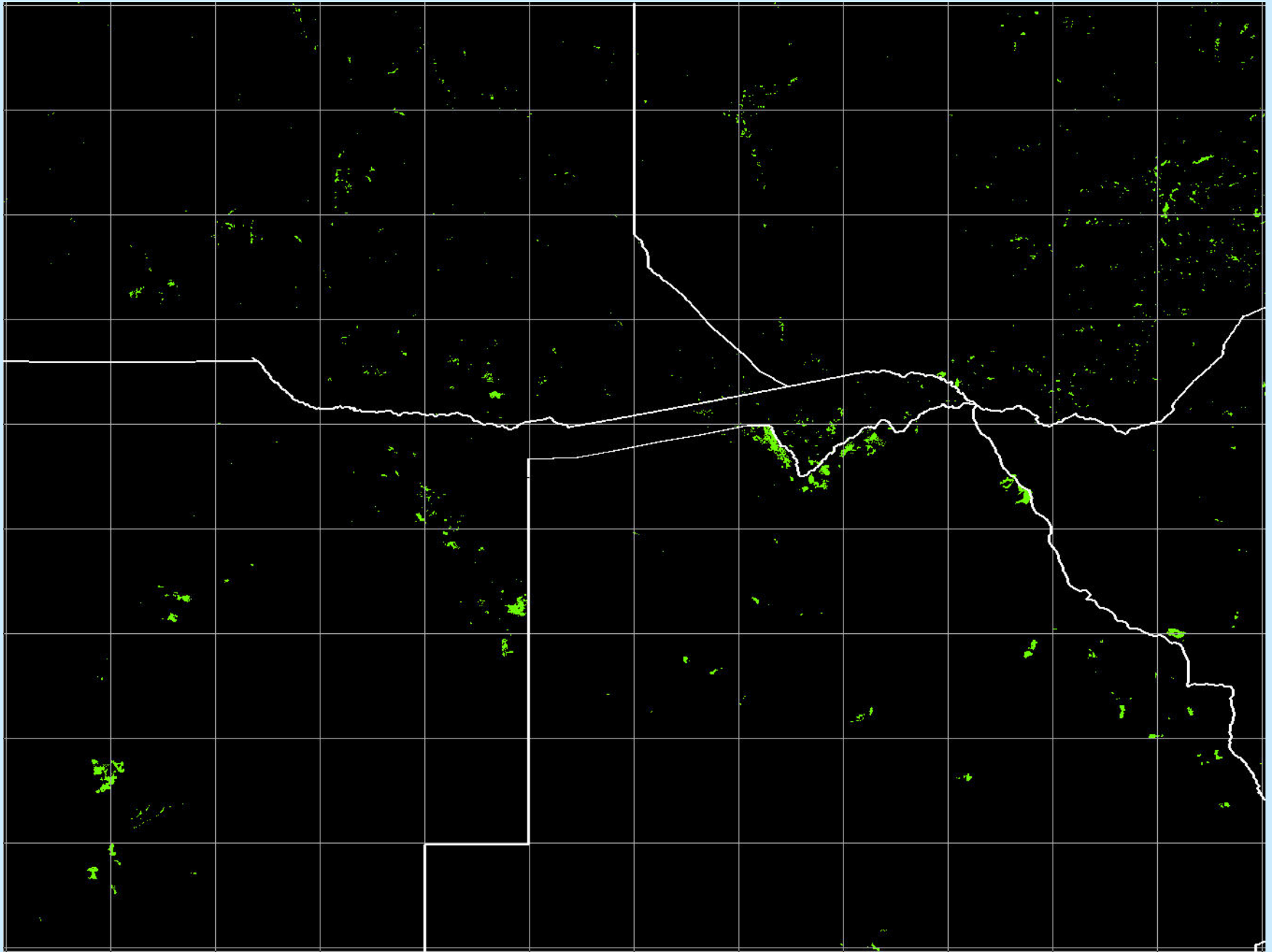


# MODIS - 12x9° detail, Southern Africa September 2000 (Roy et al)

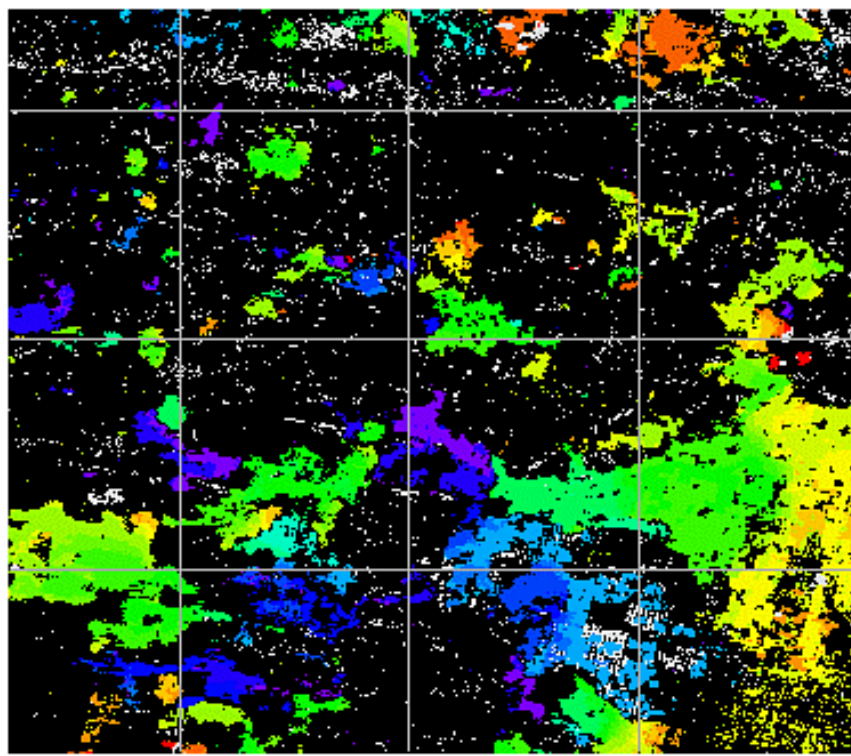




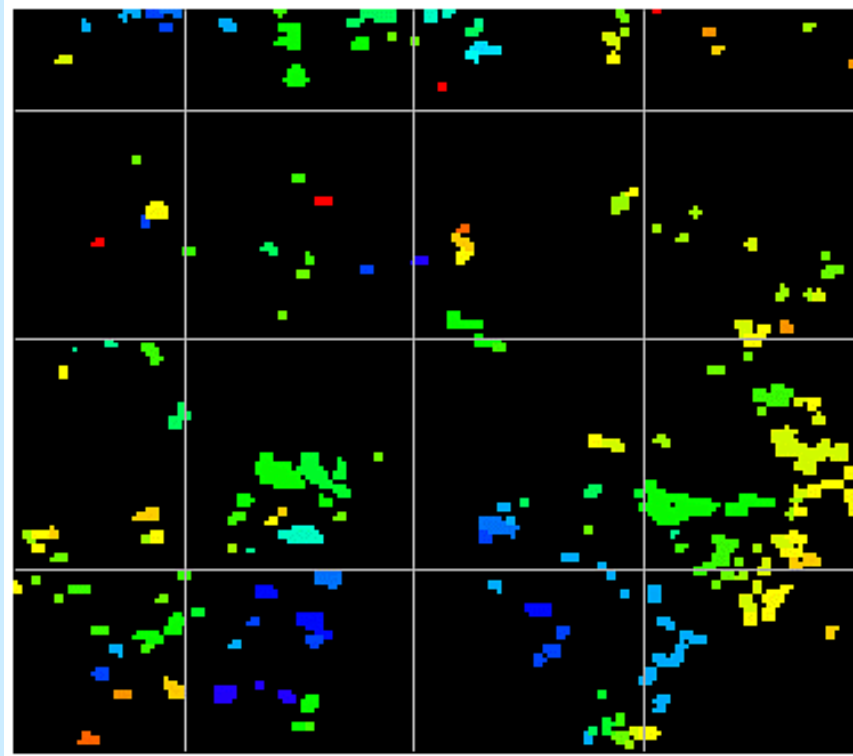
GBA - 12x9° detail, Southern Africa September 2000 (Roy et al)



# MODIS Burned Area Product Evaluation



Burn location and occurrence (500m) days 249–290



Active fire location and occurrence (1km) days 249–290

***Left***      burned area algorithm results -> burning over days 249-290 (500m)

***Right***     temporal composite of MODIS day and night active fires detected over same period (1km)

## **Key**

***purple*** - beginning of the time series (day 249)

***red***      - end of time series (day 290)

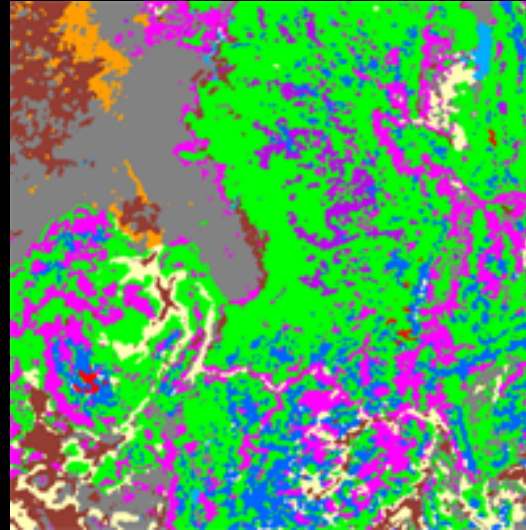
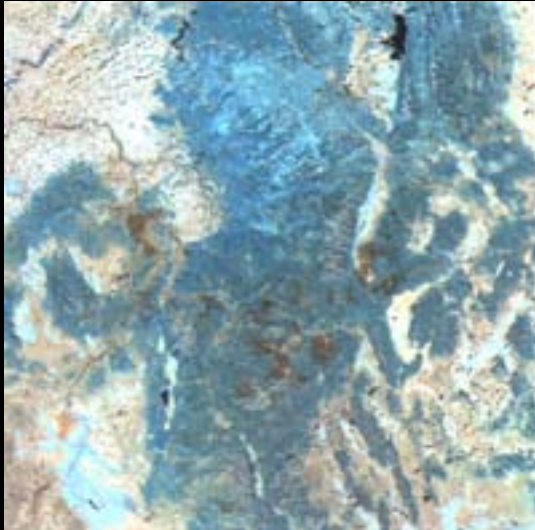
***white*** - insufficient data in the time series to make a burning decision



# MODIS Fire Emissions



**Idaho/Montana September 5, 2000**



Attributes of ShuffZap

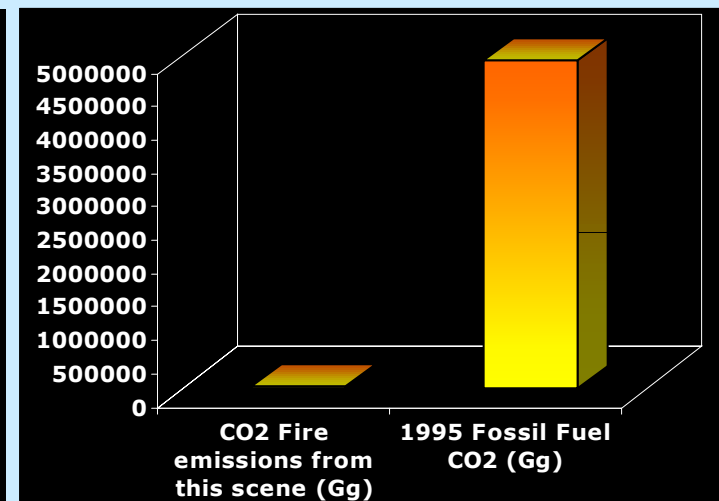
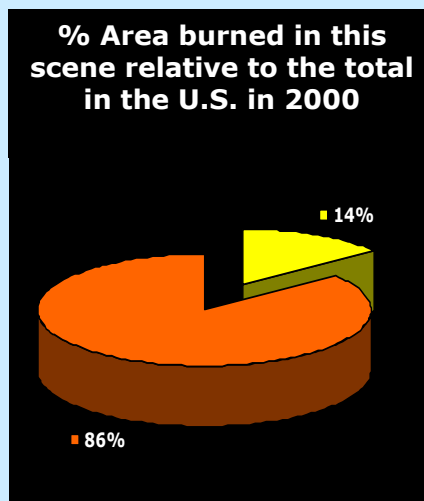
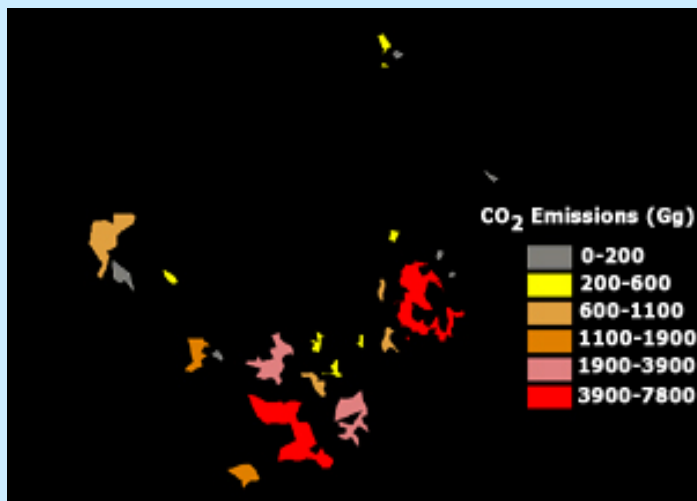
Shape	ID	Area	Fuel load (Mg/ha)	EF CO <sub>2</sub> (g/kg)	EF CO <sub>2</sub> (Mg/ha)	CF	EF CO <sub>2</sub> (Mg/ha)	CF CO <sub>2</sub> (Mg/ha)
Polygon	1	6200.00	10.16	1741	174100.00	0.05	8526711.2000	932
Polygon	2	14200.00	1.90	1741	174100.00	0.05	2993870.3000	40
Polygon	3	21000.00	61.60	1606	1606000.00	0.05	105395916000.00	1894
Polygon	4	3300.00	41.20	1700	1700000.00	0.05	19604360000.00	197
Polygon	5	44400.00	61.60	1606	1606000.00	0.05	2919595634000.00	3620
Polygon	6	164700.00	35.32	1741	1741000.00	0.05	5472491239400.00	5472
Polygon	7	38000.00	49.51	1741	1741000.00	0.05	1527961360000.00	1534
Polygon	8	46600.00	41.45	1741	1741000.00	0.05	2058433644500.00	2059
Polygon	9	13000.00	61.60	1606	1606000.00	0.05	114763400000.00	1148
Polygon	10	3900.00	61.60	1606	1606000.00	0.05	34429794000.00	344
Polygon	11	10150.00	61.60	1606	1606000.00	0.05	89161746000.00	892
Polygon	12	6800.00	61.60	1606	1606000.00	0.05	582841136000.00	583
Polygon	13	104600.00	59.44	1700	1700000.00	0.05	777901600000.00	7779
Polygon	14	1300.00	6.70	1606	1606000.00	0.05	12402701000.00	12
Polygon	15	3200.00	21.30	1606	1606000.00	0.05	97000936000.00	98
Polygon	16	6000.00	10.80	1741	1741000.00	0.05	108009140000.00	109
Polygon	17	3200.00	61.60	1606	1606000.00	0.05	262435272000.00	262
Polygon	18	1300.00	61.60	1606	1606000.00	0.05	11476340000.00	115
Polygon	19	5900.00	61.60	1606	1606000.00	0.05	52084564000.00	521
Polygon	20	6100.00	61.60	1606	1606000.00	0.05	53952156000.00	539
Polygon	21	4000.00	61.60	1606	1606000.00	0.05	406003256000.00	406
Polygon	22	5800.00	34.15	1606	1606000.00	0.05	263954117000.00	264
Polygon	23	12700.00	61.60	1606	1606000.00	0.05	112142792000.00	1121

MODIS burned area composite

x NFDNR Fuel model

x

EF and CF from Ward and Hardy (1991)







# Land Data Operational Product Evaluation

*This web page is owned and maintained by the Land Data Operational Product Evaluation (LDOPE) facility.*

[!\[\]\(666e09182d4cd268646ea700ea60dcdf\_img.jpg\) Quick Guide to MODLAND QA](#)

[!\[\]\(c3d993ca47bfe2a953c700506ce31fa0\_img.jpg\) QA Personnel & Points of Contact](#)

[!\[\]\(d66ff64371a51729ac8c1cdaa685ba6f\_img.jpg\) Product Specifications](#)

[!\[\]\(e3f8612927870f2e0f9f5989e6dd3064\_img.jpg\) Algorithm Theoretical Basis Documents](#)

[!\[\]\(003082e50e3009141f59bd5df831749f\_img.jpg\) Product Interdependencies](#)

[!\[\]\(17413706fd4997a1a4bdf85c6864eee1\_img.jpg\) Golden Tiles](#)

[!\[\]\(faf942dc3e59ce8eb64b4ac481eca7e0\_img.jpg\) LDOPE QA Database](#)

[!\[\]\(cf531ed27e91483460120fcc057b3901\_img.jpg\) QA Tools](#)

[!\[\]\(d3102649f02e825ddb76dc3de0190154\_img.jpg\) Product Quality Documentation](#)

[!\[\]\(4b7a79268f6ba26c1471d4232fffa85a\_img.jpg\) Known Issues](#)

[!\[\]\(95b425611cbd2b8716a140cf67c81822\_img.jpg\) Global Browse Images](#)

[!\[\]\(b4eeff342f60cc7bcd67d869b4fedca2\_img.jpg\) MODAPS Production Links](#)

[!\[\]\(4f6bf54ae7e4144a72d78316053e412d\_img.jpg\) Platform, Calibration, Geolocation Links](#)

[!\[\]\(3342c215b2a8b663596a81468d5dc314\_img.jpg\) MODIS Web Organigram](#)

Updated 18 January 2001

Please direct questions or comments by email to David Roy [droy@kratmos.gsfc.nasa.gov](mailto:droy@kratmos.gsfc.nasa.gov)

*Responsible NASA official: Ed Masuoka*

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providing a leadership  
role in establishing  
QA as an integral part  
of the data system

documenting product  
quality leading to  
algorithm updates

addressing product  
dependencies  
and establishing time  
series QA record

**MODLAND/Roy et al**

# MODIS land team



<http://modis.gsfc.nasa.gov/MODIS/LAND/VAL/>

- Land validation coordination
- Validation plans
- Validation data collection protocol
- MODIS/EOS Land Core Sites
- Field Data coordination – w. ORNL – Mercury System
- High resolution acquisition (L7, Aster, Ikonos w/ SDP)
- Other correlative data e.g SeaWiFS
- Validation campaign support SAFARI 2k. LBA
- International Validation Program Representation
  - CEOS Land Product Validation

# **MODIS Land Products at EDC DAAC (1)**

## ***MOD09 Surface Reflectance***

- **MODIS/Terra Surface Reflectance 8-Day L3 Global 500m ISIN Grid**
- **MODIS/Terra Surface Reflectance Daily L2G Global 500m ISIN Grid**
- **MODIS/Terra Surface Reflectance Daily L2G Global 250m ISIN Grid**
- **MODIS/Terra Surface Reflectance Quality Daily L2G Global 1km ISIN Grid**
- **MODIS/Terra Surface Reflectance 8-Day L3 Global 250m ISIN Grid**

## ***MOD11 Land Surface Temperature***

- **MODIS/Terra Land Surface Temperature/Emissivity 5-Min L2 Swath 1km**
- **MODIS/Terra Land Surface Temperature/Emissivity Daily L3 Global 1km ISIN Grid**
- **MODIS/Terra Land Surface Temperature/Emissivity 8-Day L3 Global 1km ISIN Grid**
- **MODIS/Terra Land Surface Temperature/Emissivity Daily L3 Global 5km ISIN Grid**

## ***MOD12 Land Cover Type***

- **MODIS/Terra Land Cover Type 96-Day L3 Global 1km ISIN Grid**

## ***MOD13 Vegetation Indexes***

- **MODIS/Terra Vegetation Indices 16-Day L3 Global 500m ISIN Grid**
- **MODIS/Terra Vegetation Indices 16-Day L3 Global 1km ISIN Grid**
- **MODIS/Terra Vegetation Indices 16-Day L3 Global 250m ISIN Grid**



# MODIS Land Products at EDC DAAC (2)

## *MOD14 Thermal Anomalies/Fire*

- MODIS/Terra Thermal Anomalies/Fire 5-Min L2 Swath 1km
- MODIS/Terra Thermal Anomalies/Fire Daily L3 Global 1km ISIN Grid
- MODIS/Terra Thermal Anomalies/Fire 8-Day L3 Global 1km ISIN Grid
- MODIS/Terra Thermal Anomalies/Fire Daily L2G Global 1km ISIN Grid Day
- MODIS/Terra Thermal Anomalies/Fire Daily L2G Global 1km ISIN Grid Night (71

## *MOD15 LAI/FPAR*

- MODIS/Terra Leaf Area Index/FPAR 8-Day L4 Global 1km ISIN Grid

## *MOD17 Net Photosynthesis*

- MODIS/Terra Net Photosynthesis 8-Day L4 Global 1km ISIN Grid

## *MOD43 BRDF/Albedo*

- MODIS/Terra BRDF/Albedo Model-1 16-Day L3 Global 1km ISIN Grid
- MODIS/Terra Albedo 16-Day L3 Global 1km ISIN Grid
- MODIS/Terra Nadir BRDF-Adjusted Reflectance 16-Day L3 Global 1km ISIN Grid
- MODIS/Terra Albedo 16-Day L3 Global 0.25Deg CMG
- MODIS/Terra BRDF/Albedo Parameters 16-Day L3 Global 0.25Deg CMG

