Enhanced Land Cover and Land Cover Change Products

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Products

- At-Launch:
  - At-Launch Land Cover (MOD12Q1)
- Post-Launch:
  - Vegetative Cover Conversion (MOD44A)
  - Vegetation Continuous Fields (MOD44B)
  - 250m U.S. Vegetation Index sub-sets by state (GLCF-ESIP)

At-Launch Land Cover

- Currently includes:
  - EDC/IGBP 1km AVHRR Land Cover, Ver. 1
  - UMD 1km AVHRR Land Cover, Ver. 1
  - JPL Land/Sea Mask
- Place-holder until MODIS land cover is available
- Consistent with Boston Univ. file specification
- Content agreed by consensus of MODLAND
- Revised versions of UMD & EDC in work

UMD Version 2 AVHRR Land Cover

- New classes:
  - Small grain / broadleaf crops
  - Woodland leaf type & leaf longevity
  - Permanent ice
  - Tundra
- Nested continuous fields for sub-pixel fractional cover.
  - Allows for consistent re-aggregation

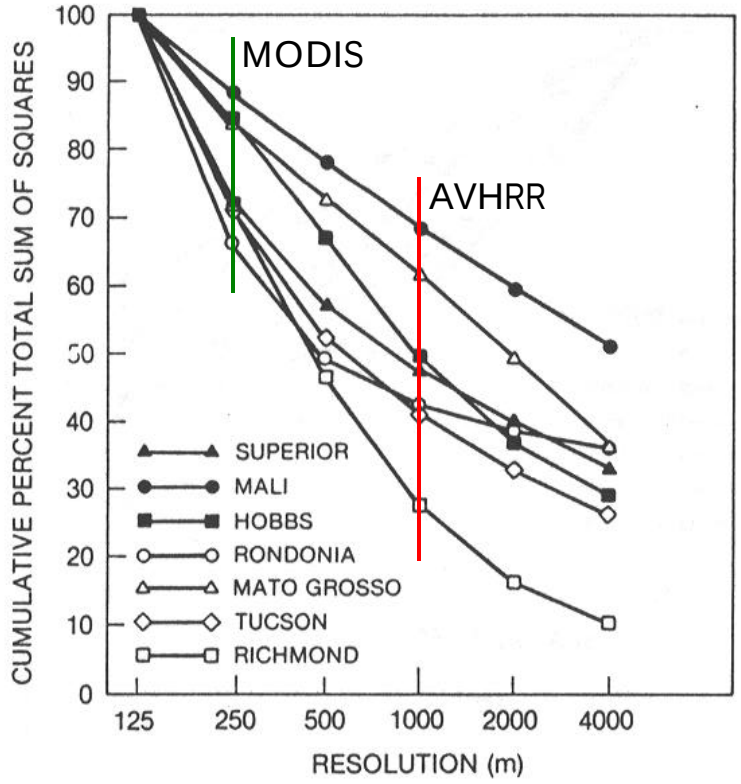
Continuous Fields

- % tree cover
  - % broadleaf
  - % needleaf
  - % evergreen
  - % deciduous
- % herbaceous
- % bare

Vegetative Cover Conversion

- Detects anthropogenic land cover change globally, in near real-time
- Derived from MODIS 250m
  - Humans operate on a scale << 1km and < 500m
- Alarm product, produced every 32 days
  - rolling 3 month and annual result
- Algorithm suite includes five methods

Land Cover Change Occurs Primarily at Spatial Resolutions Less than 1km

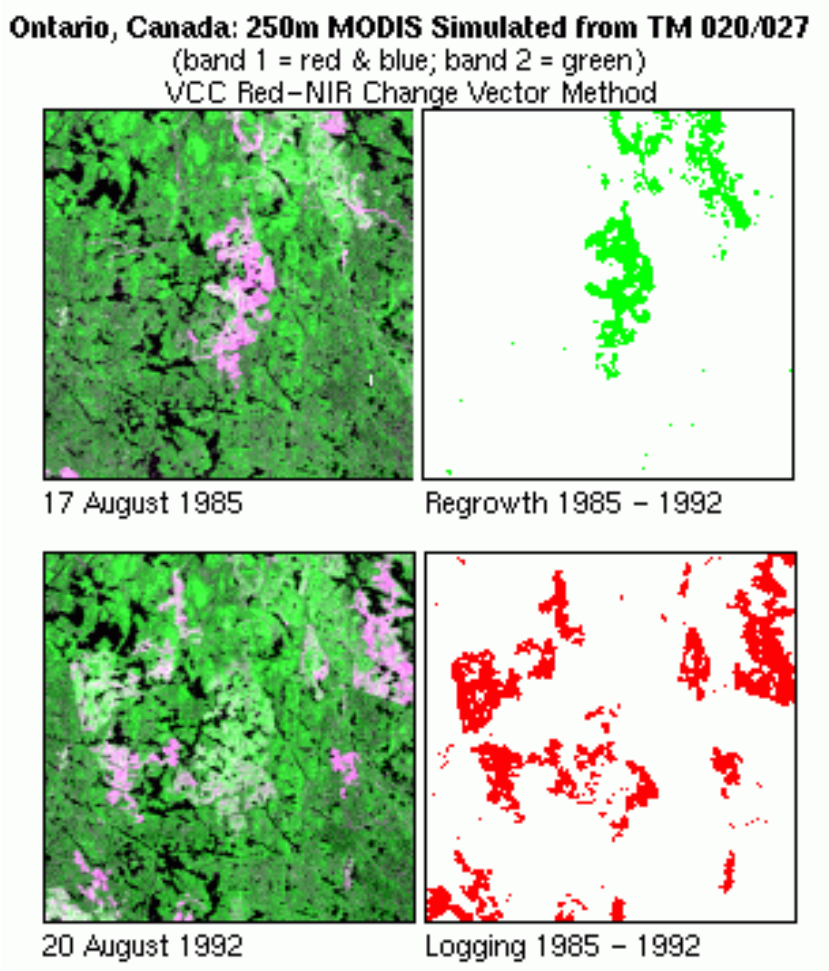


Townshend & Justice, 1988, Selecting the spatial resolution of satellite sensors required for global monitoring of land transformations. *Int. J. Remote Sensing*, **9**(2), 187-236.

Accurate Geolocation is Crucial

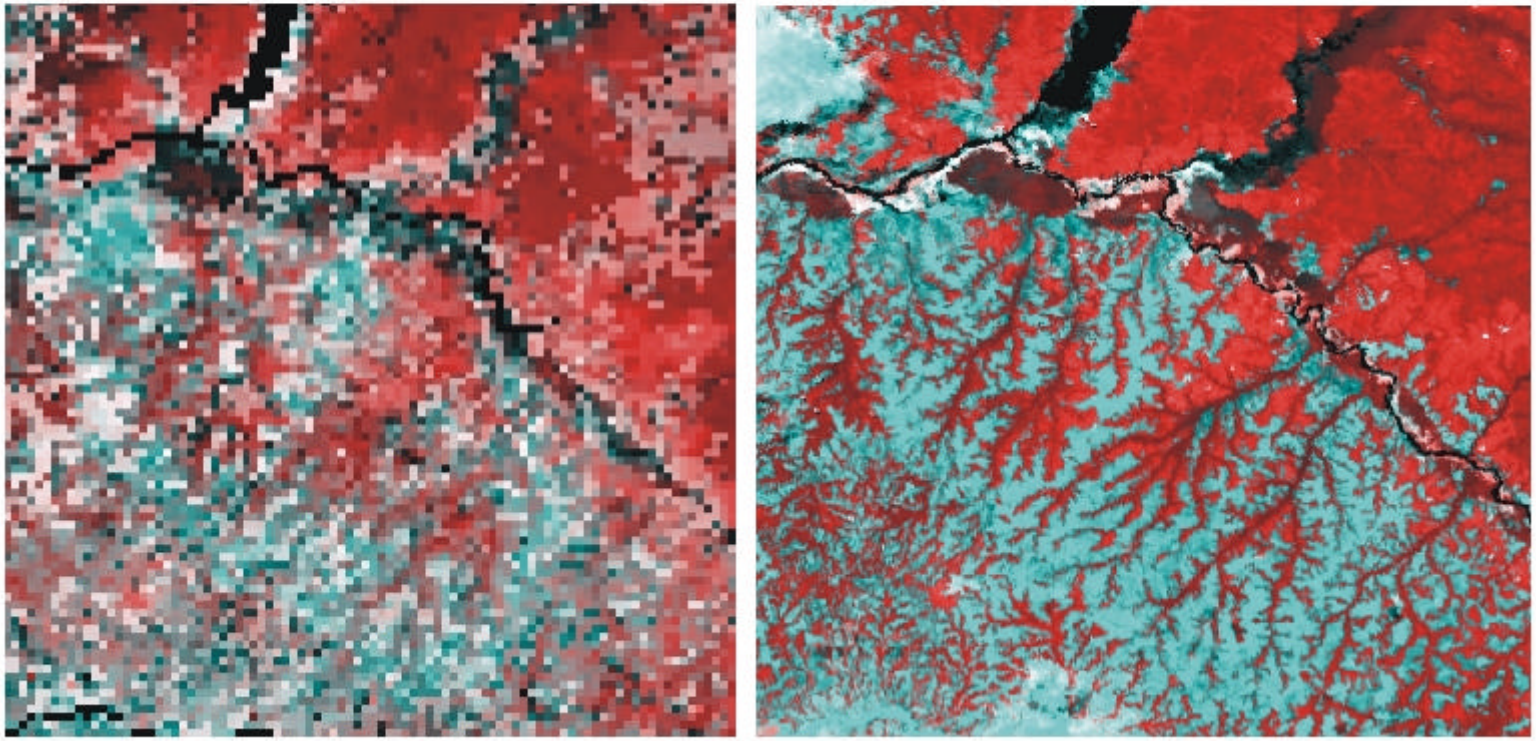
- When dealing with small objects relative to pixel size, accurate geolocation is crucial.
- MODIS band-to-band registration and geolocation results are an early success story.

UMD Vegetative Cover Conversion as Prototyped with Resampled TM



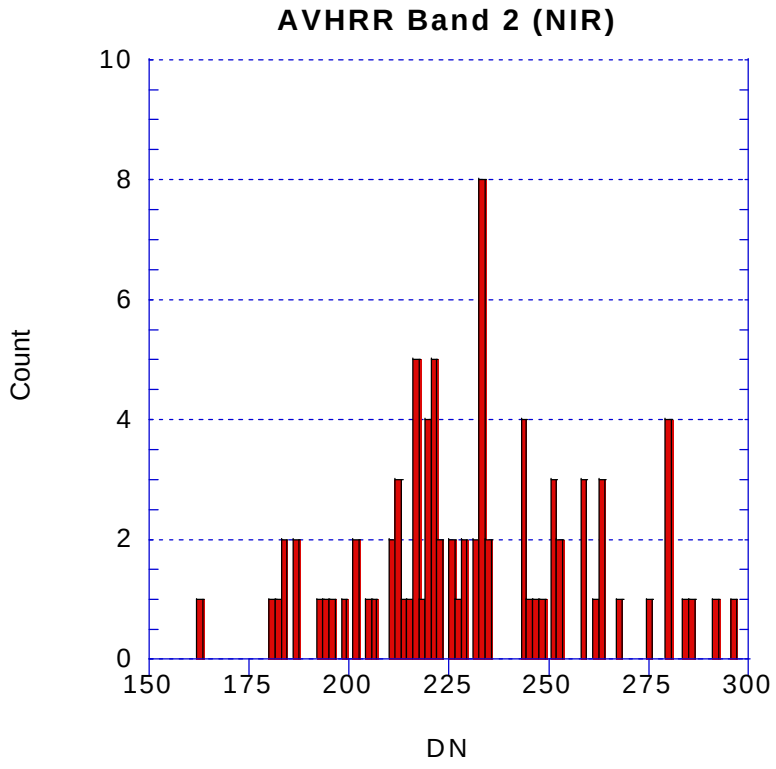
Gallery forest in Bandundu, Dem. Republic of Congo, clearly shows the additional detail MODIS provides for the study of fragmented ecosystems.

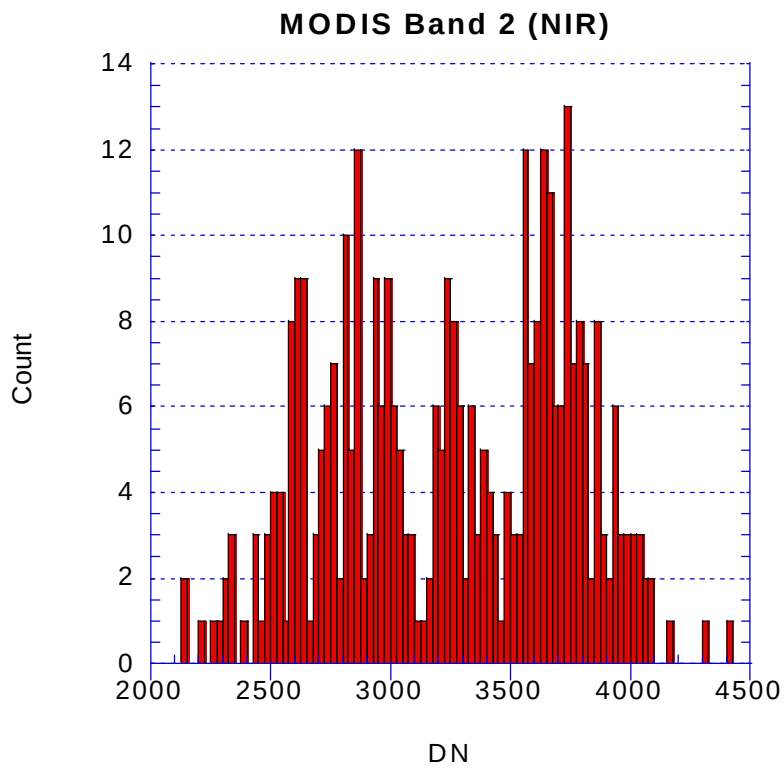
MODIS has high value where there is high spatial variability.



Comparison of a Transect Across Closed Canopy and Gallery Forest

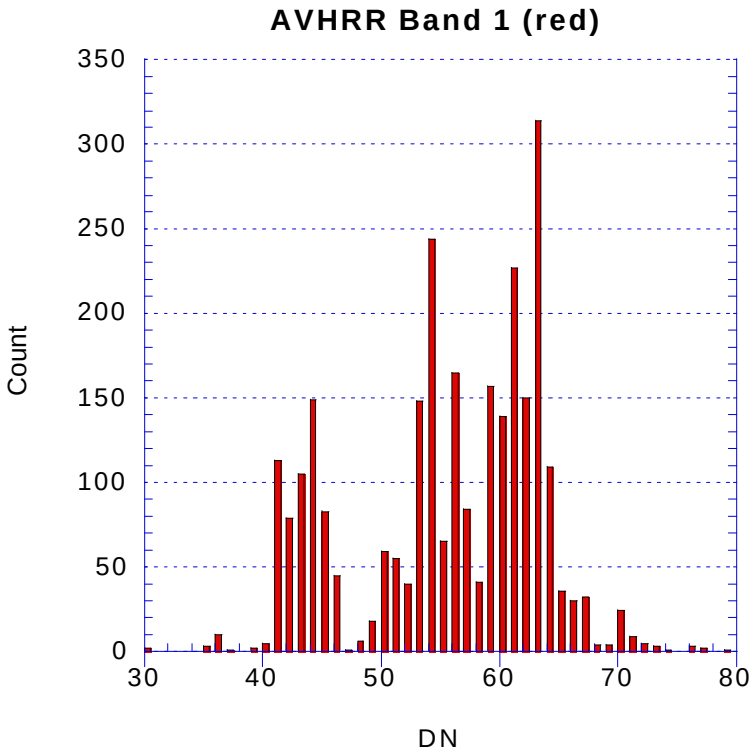
Note the additional information content in MODIS 250m data.

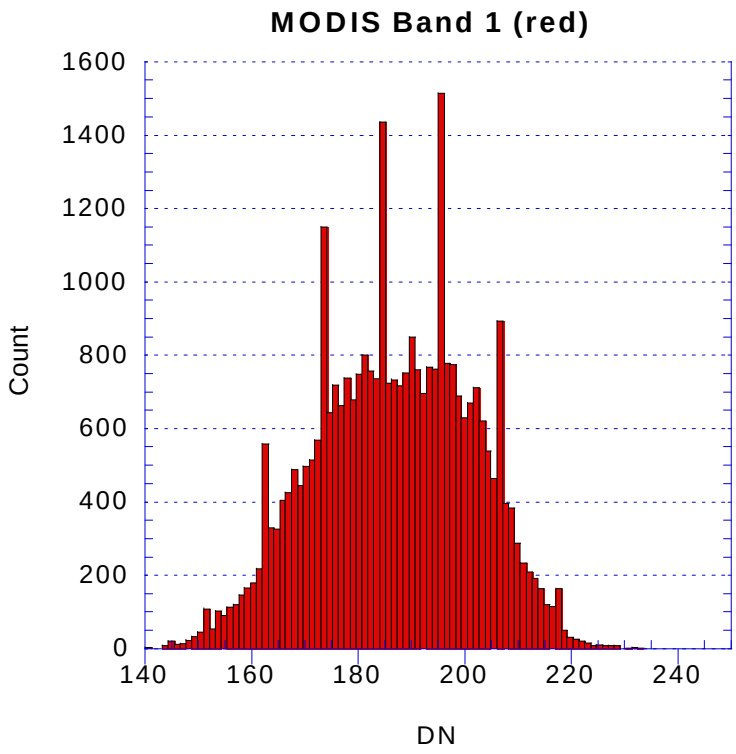




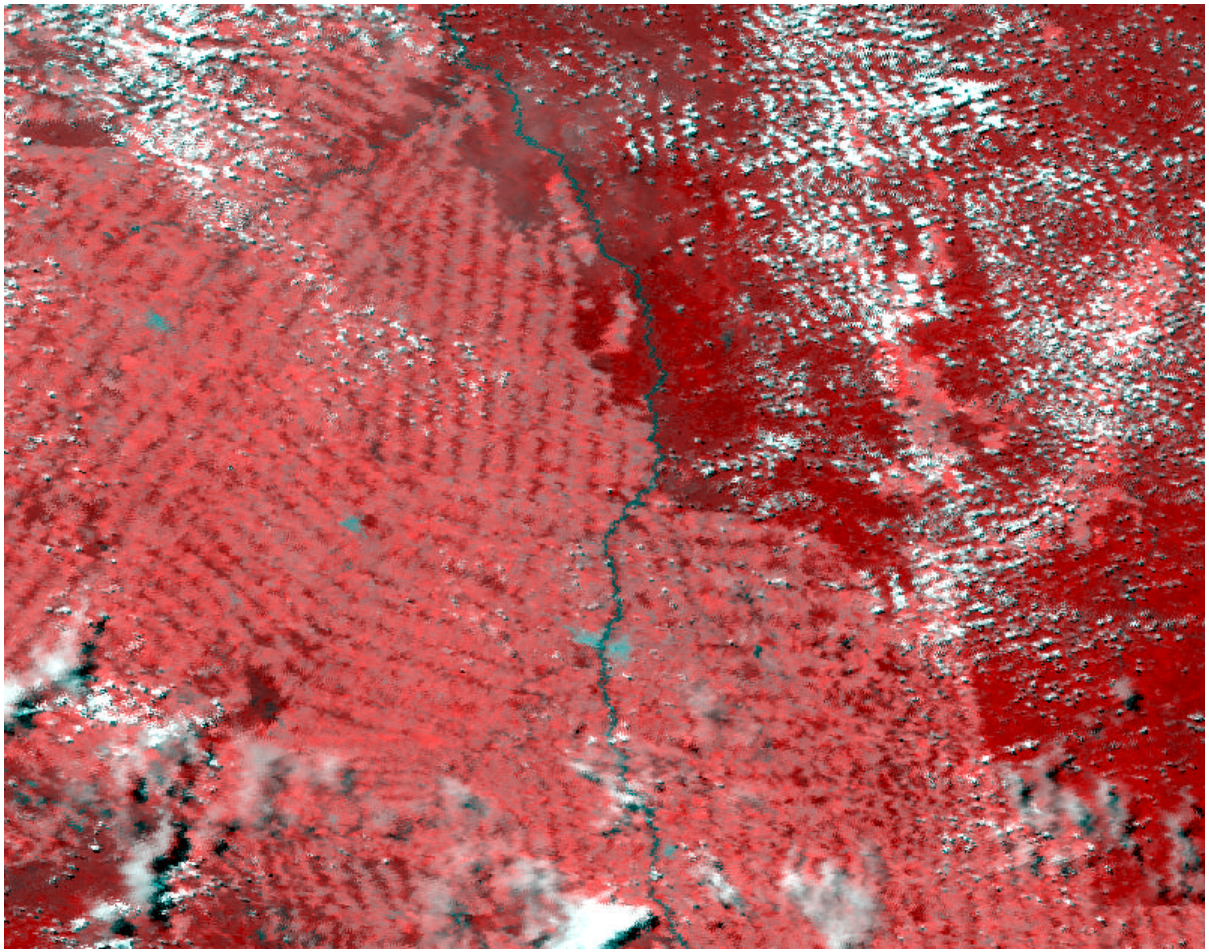
Signal from Closed Canopy Humid Forest

Additional detail at the low end of the red will assist in tree cover discrimination and study of forest disturbance.



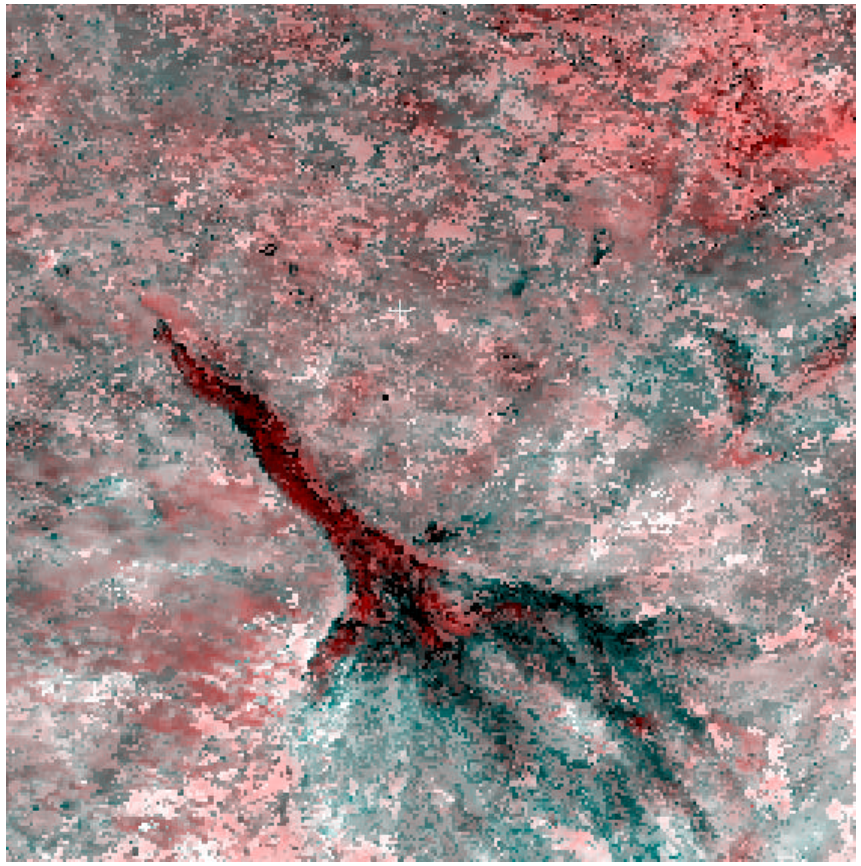


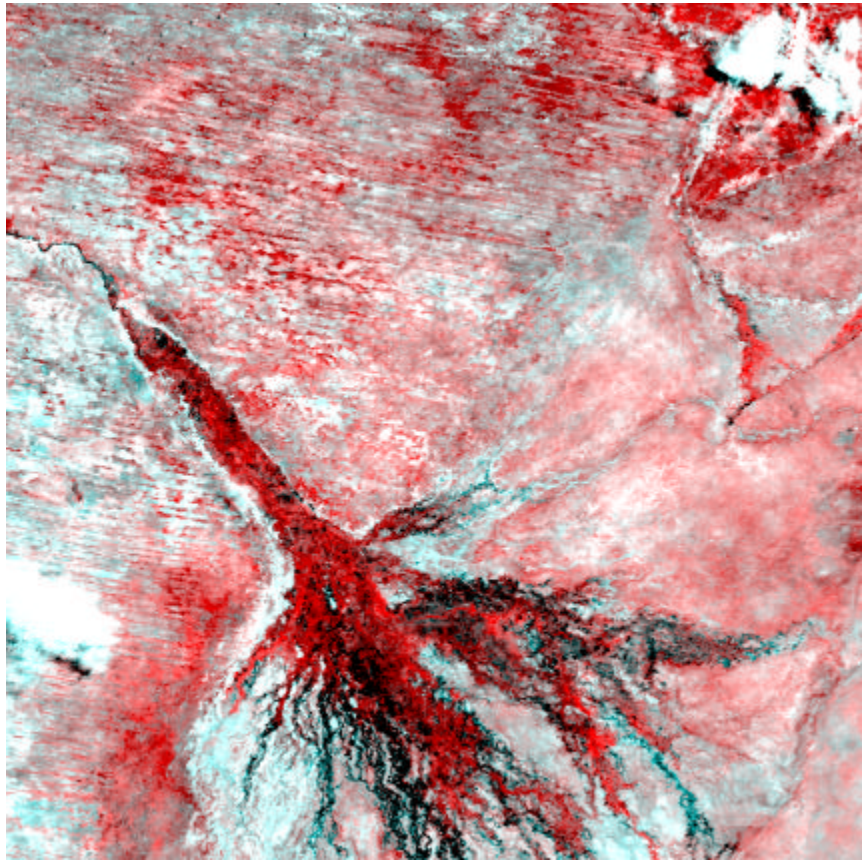
Here are additional examples of the data which is being acquired.



MODIS 250m of Rondonia, Brazil
showing forest cleared for agriculture.

Okavango Swamp of Botswana
with vegetated linear dunes to the north.



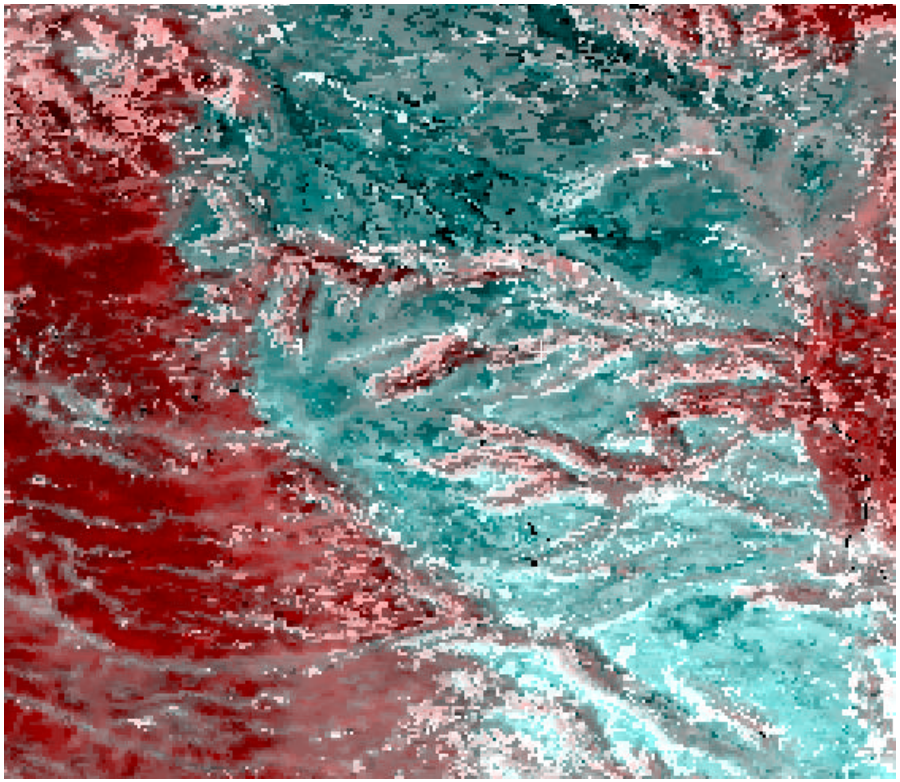


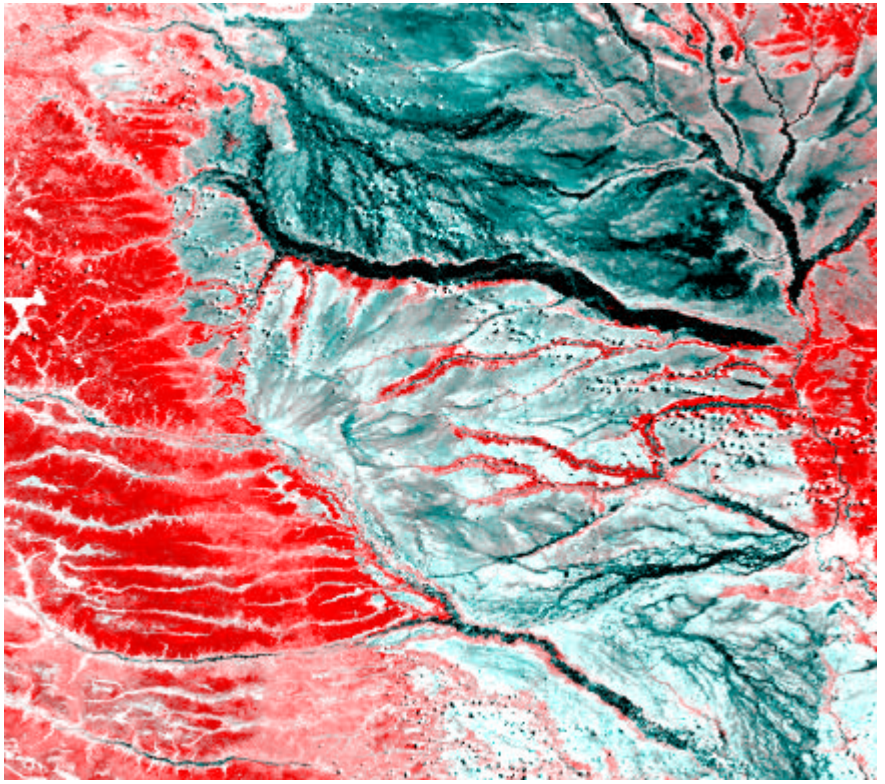
10 km

AVHRR

MODIS

Drainage networks from woodland and grassland into the Zambezi River (Moxico, Angola).



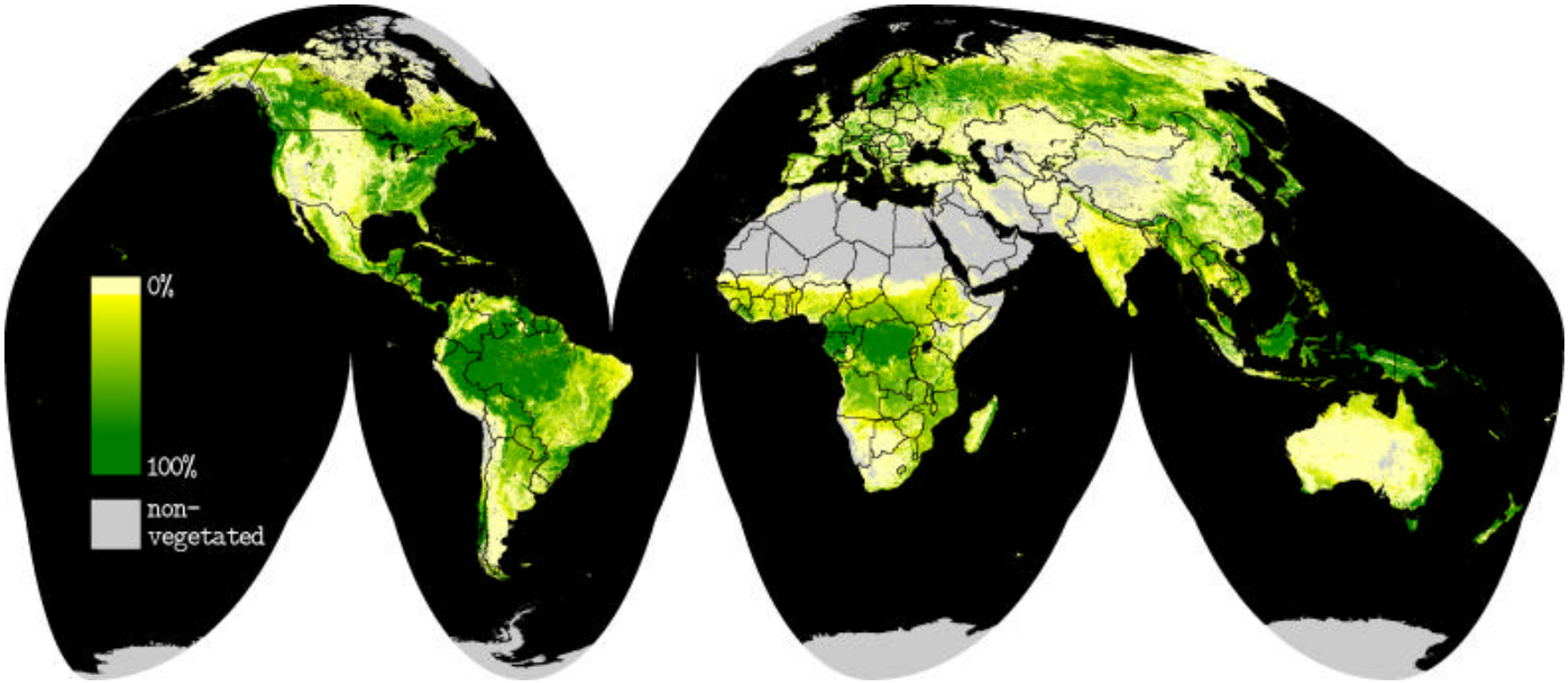


AVHRR

10 km

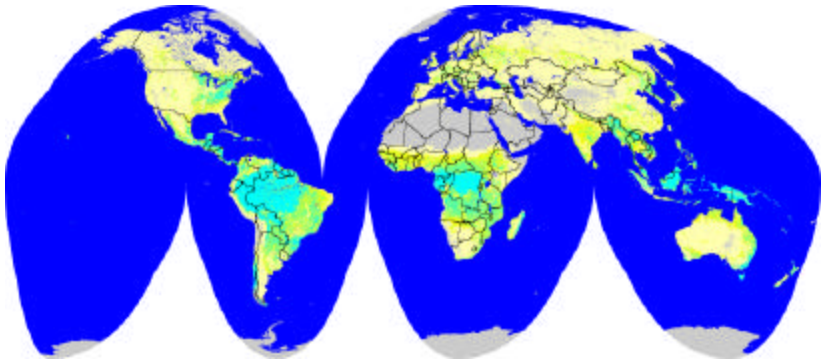
MODIS

Vegetation Continuous Fields
Percent Tree Cover Derived from AVHRR

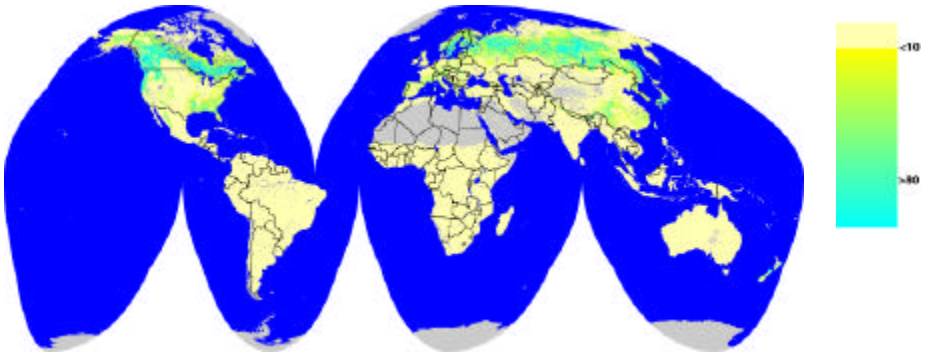


- Describes sub-pixel heterogeneity
- Continuous characterization avoids discrete classes
- MODIS version will use 250m & 500m inputs

Leaf type

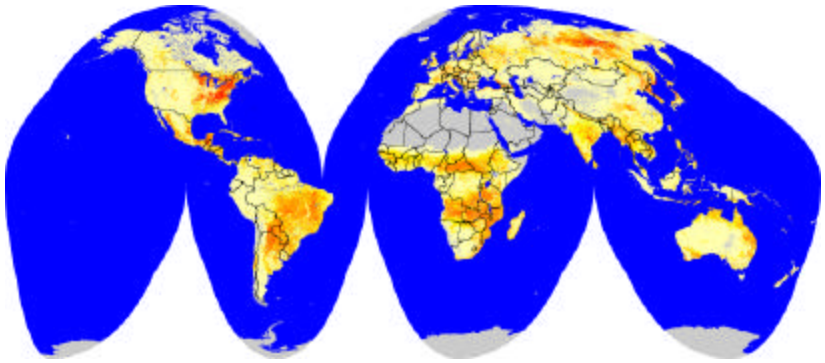


% broadleaf

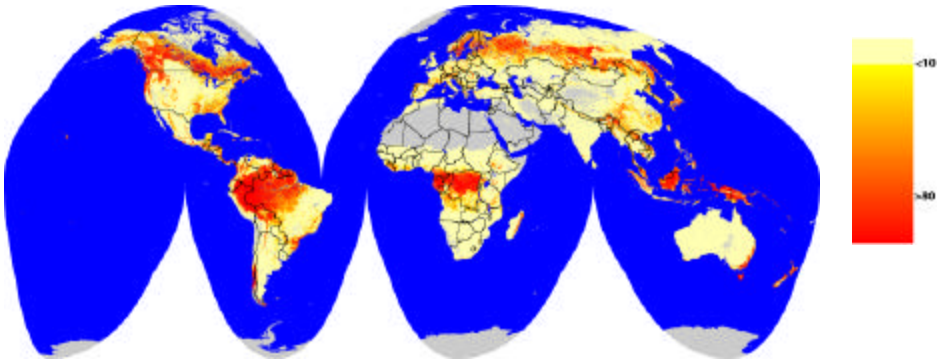


% needleleaf

Leaf longevity



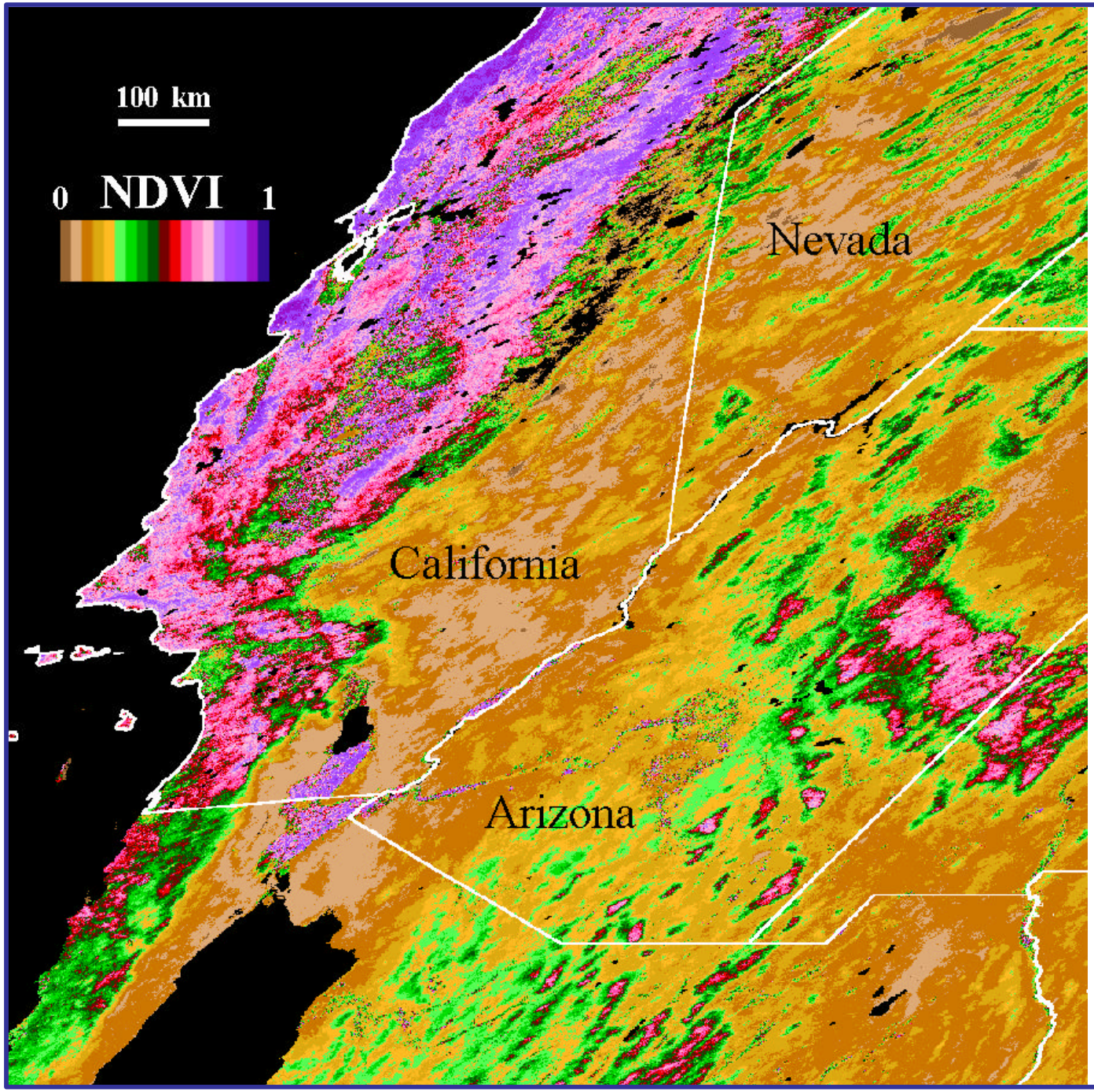
% deciduous



% evergreen

Value-Added 250m Products

- A cooperative venture with the ESIP Federation.
- MODLAND at GSFC will distribute 250 m Surface Reflectance data.
  - http://modis-250m.nascom.nasa.gov
- UMD Global Land Cover Facility will distribute 250m value-added products.
  - 16-day NDVI & SR composites for conterminous U.S.
  - subsets by state
  - http://glcf.umiacs.umd.edu



MODIS 250m

This early NDVI composite for the American southwest was created from L2G Surface Reflectance for 21-22/3/2000 and 4-5/4/2000. Snow cover and water bodies appear black.

Estimated Production Schedule

At-Launch Land Cover	Available now, revisions at direction of the team
250m U.S. Vegetation Index	Expected release July 2000 *
Vegetative Cover Conversion	4 months of calibrated data with 100m RMS geolocation
Vegetation Continuous Fields	1 year of calibrated data

* contingent upon near-term availability of upstream inputs