

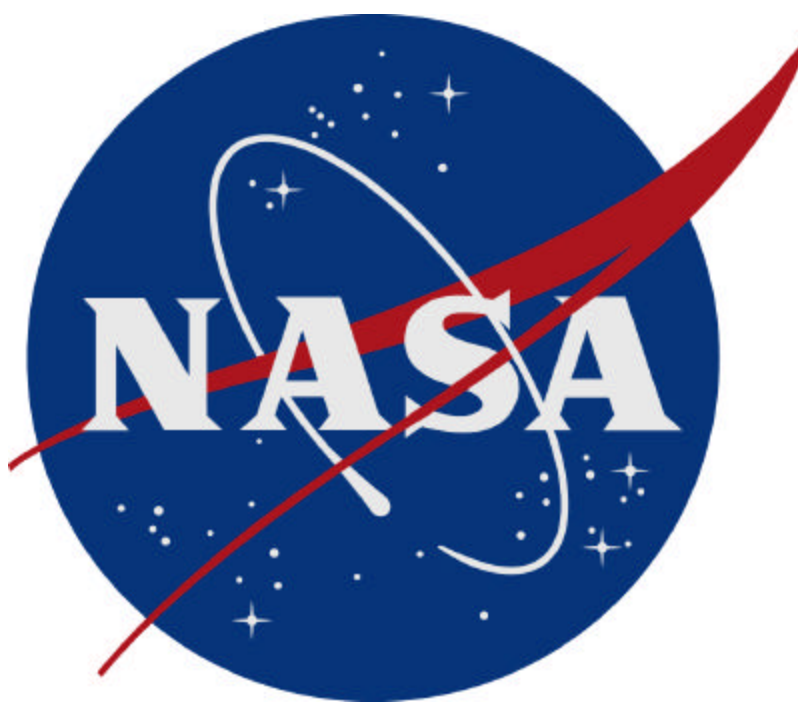


The MODIS Global Land Cover Product: Land Cover Type and Vegetation Phenology

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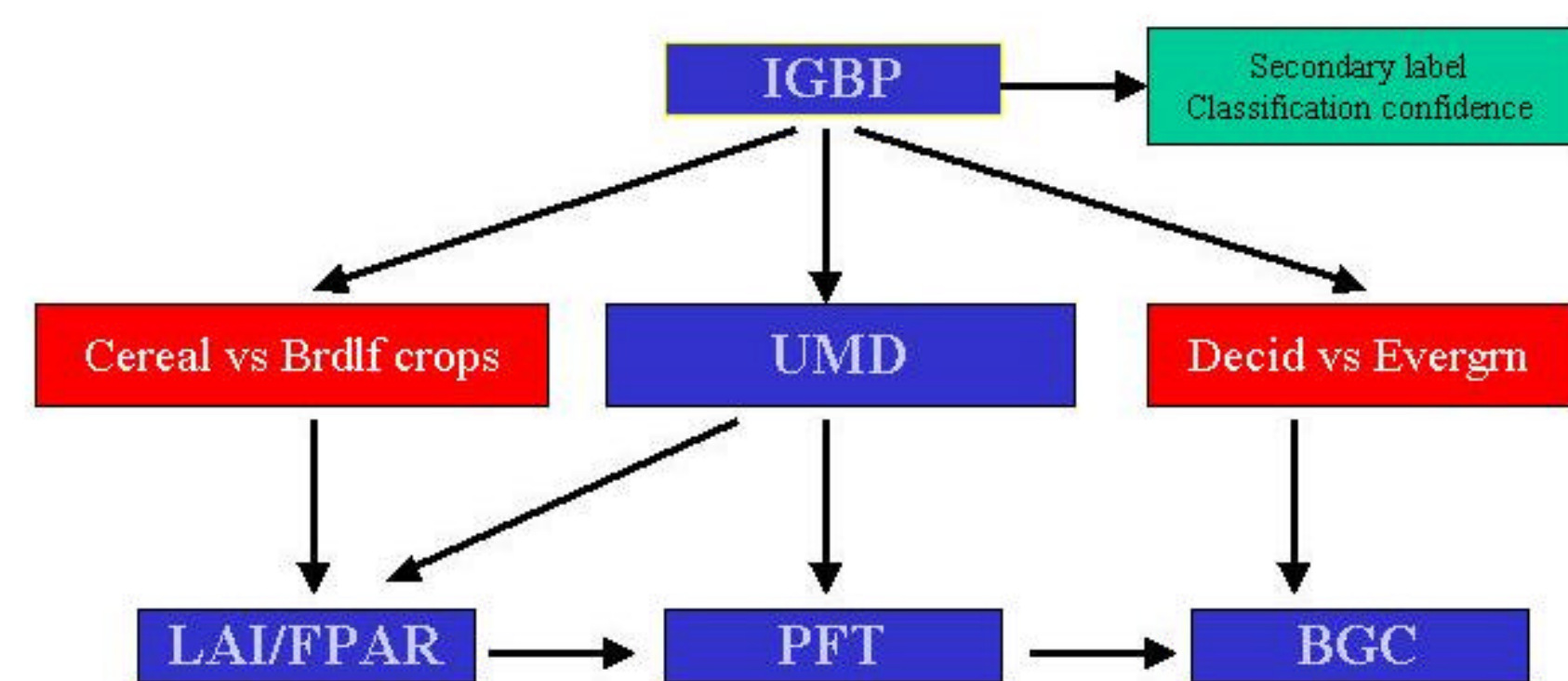
MOD12: Overview

A global database of land cover type classes and vegetation phenology

- MOD12Q1: Land cover type
- MOD12Q2: vegetation phenology
- Prepared at 1-km spatial resolution from MODIS data
- Available in coarser resolutions of 1/20°, 0.25°

MOD12Q1 - Data layers

Five "Internally Consistent" Layers of Land Cover Class Labels



IGBP: International Geosphere-Biosphere Programme classes; **UMD:** University of Maryland Land Cover Classes; **LA/FPAR:** Classes for LAI/FPAR Production; **BGC:** Biome BGC Model Classes; **PFT:** Community Land Model classes

•Plus:

- Confidences: Classification confidence (percent scale) for each pixel for each label
- Secondary IGBP Label: Second most likely IGBP class at each pixel
- Quality Assurance for each Pixel: Quality bits, last update, and land/water mask

MOD12Q1: Classification Methodology

Supervised Classification

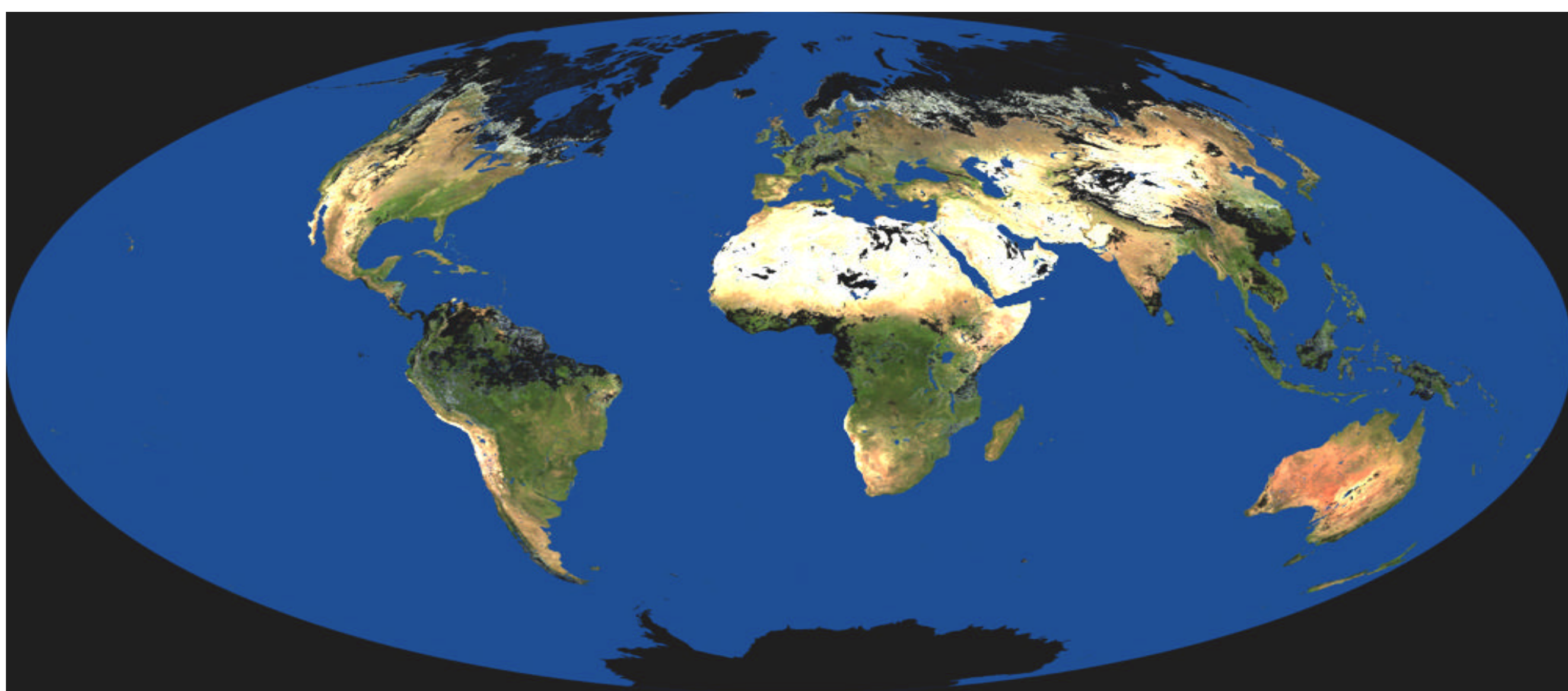
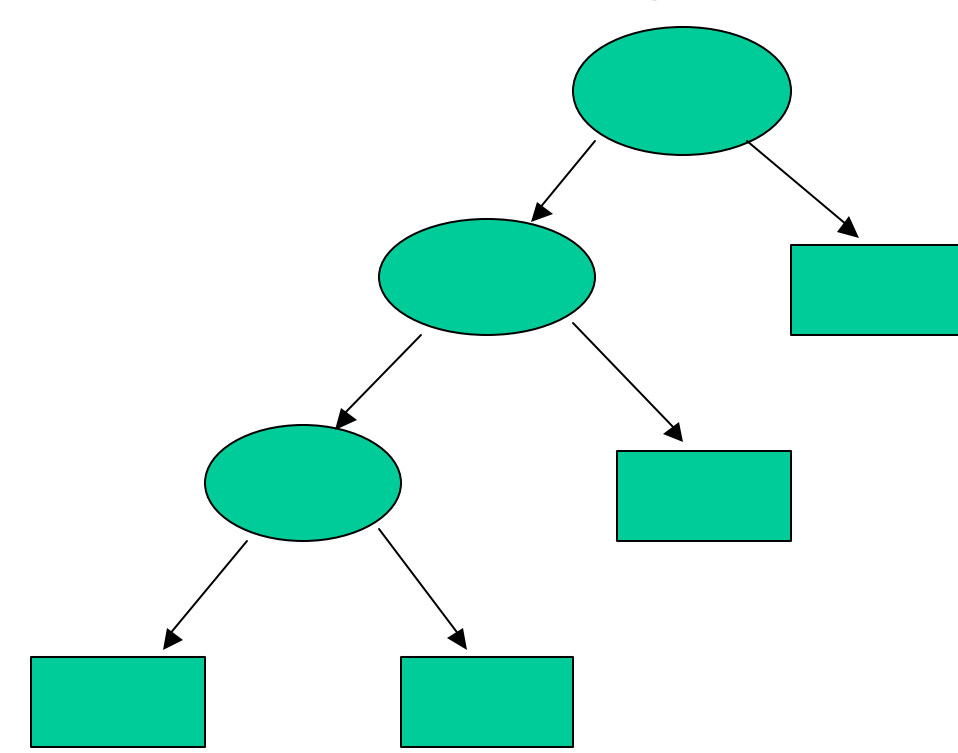
- Use of supervised mode with training sites
- Allows rapid reclassifications for tuning

C4.5 Univariate Decision Tree

- Fast algorithm
- Uses boosting to improve accuracy, estimate confidence

Input Data

- Nadir BRDF Adjusted Surface Reflectance (NBAR)
 - ≠ View-angle corrected surface reflectance, 7 land bands
 - ≠ Enhanced Vegetation Index (EVI)
 - ≠ Annual Cycle of 32-Day Quality Composites



Global True Color Composite from NBARS, May 23-June 6, 2001

MOD12Q1: Global Land Cover Training Site Database

Compiled from Landsat Thematic Mapper

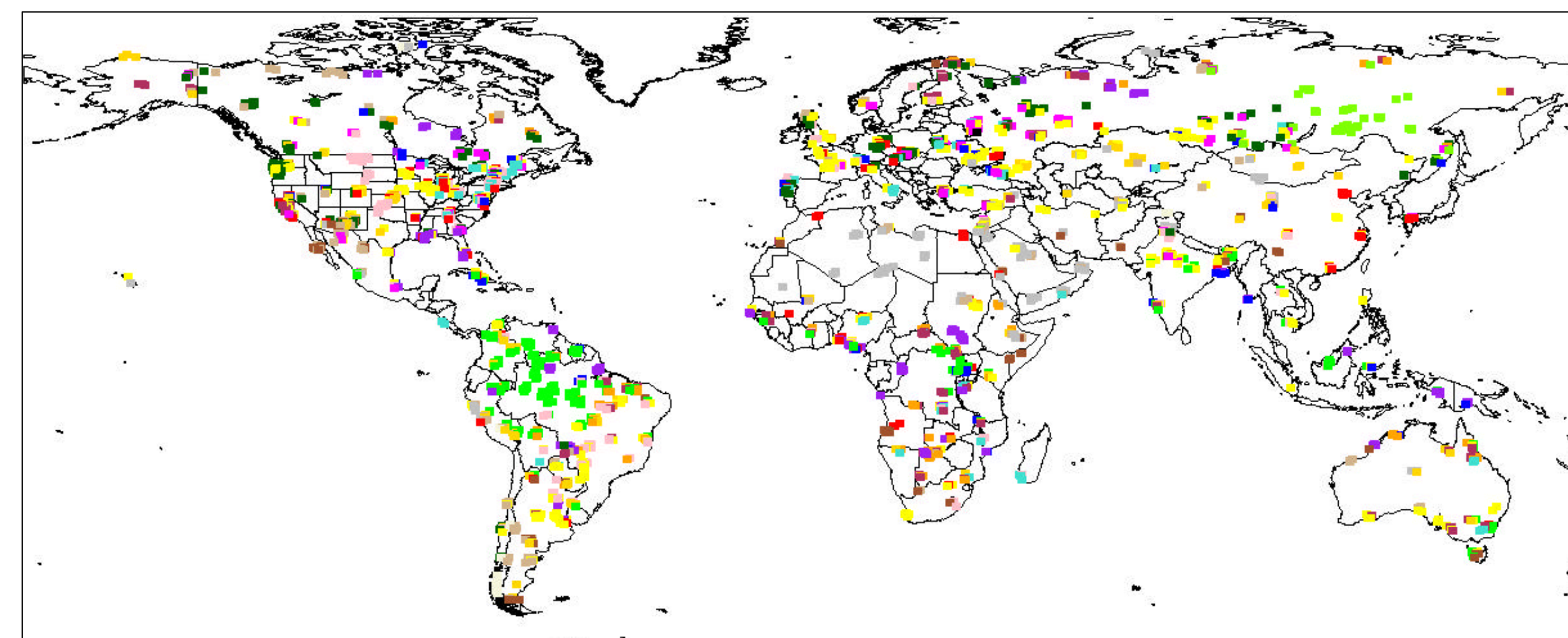
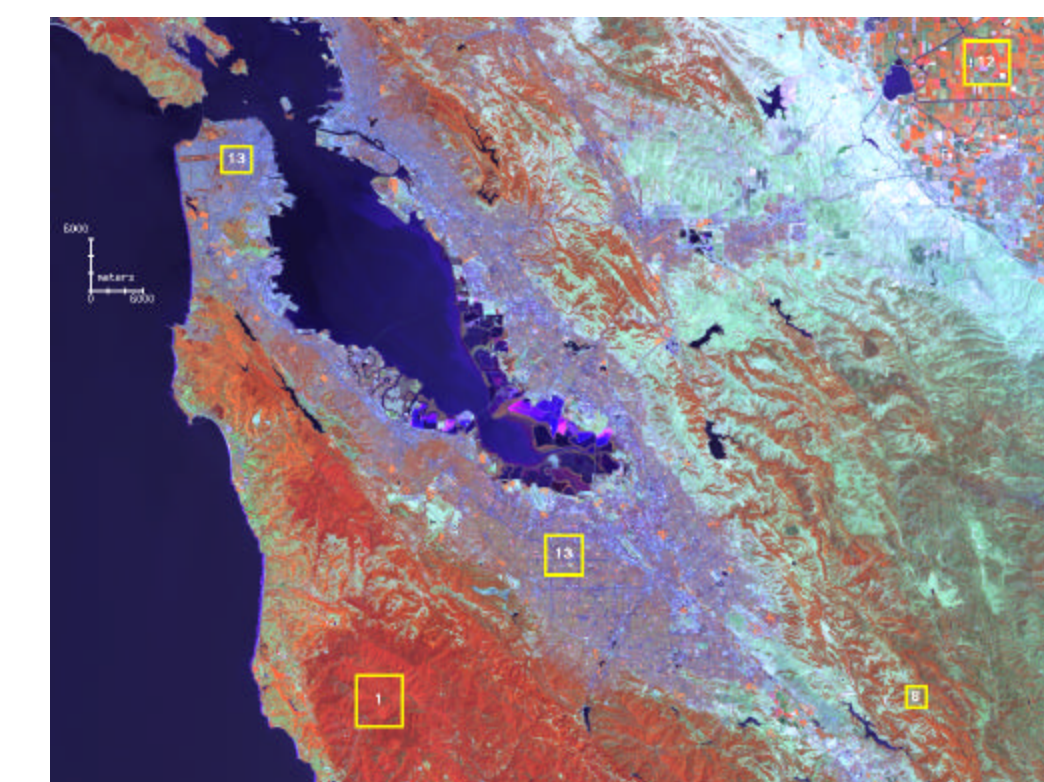
- In association with available ancillary data

STEP:

- System for Terrestrial Ecosystem Parameterization
- Life form, cover fraction
- Leaf type, phenology
- Elevation, moisture regime, perturbation
- Simple description of site and type (text)

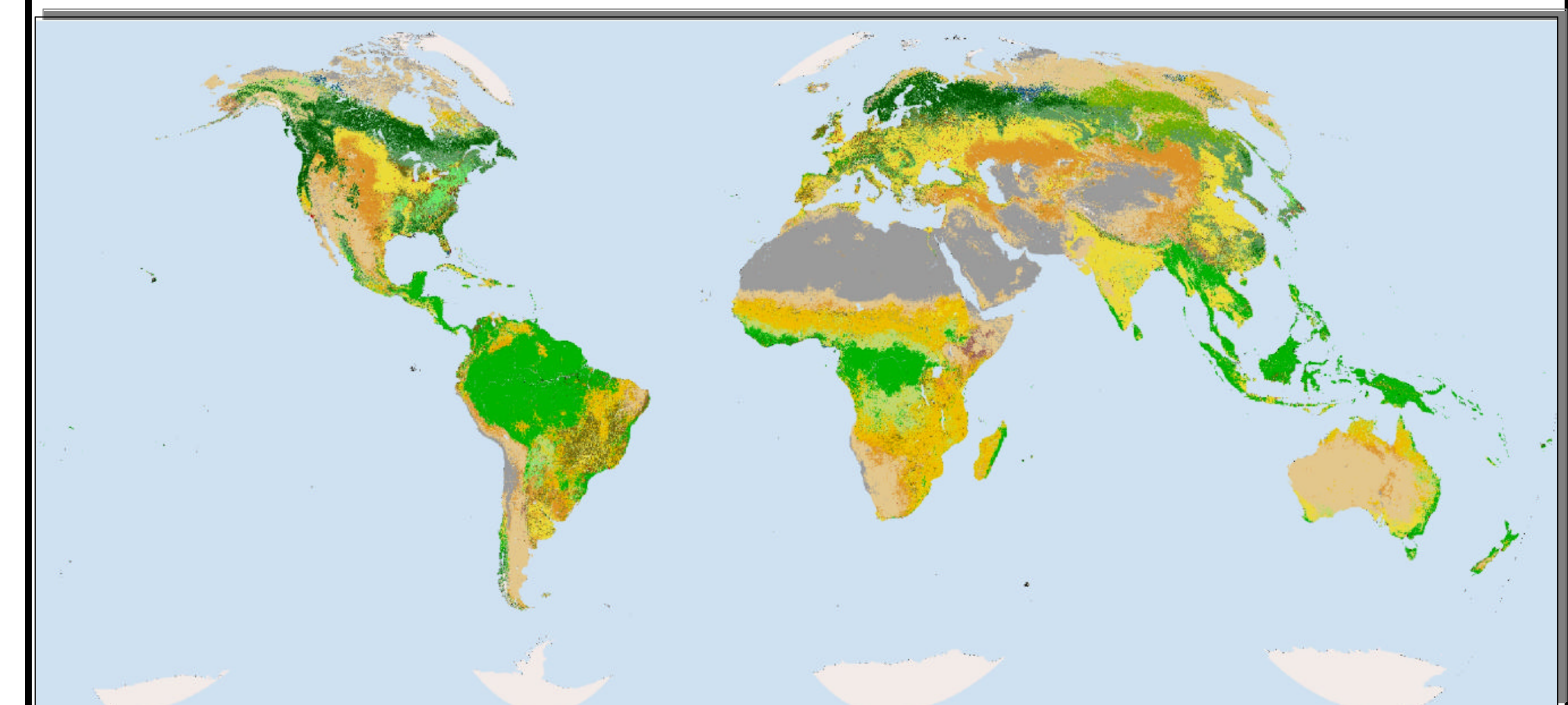
STEP Flexibility

- Not restricted to single land cover classification scheme!
- Allows application of many different land cover labeling schemes by inference of label from parameters in database

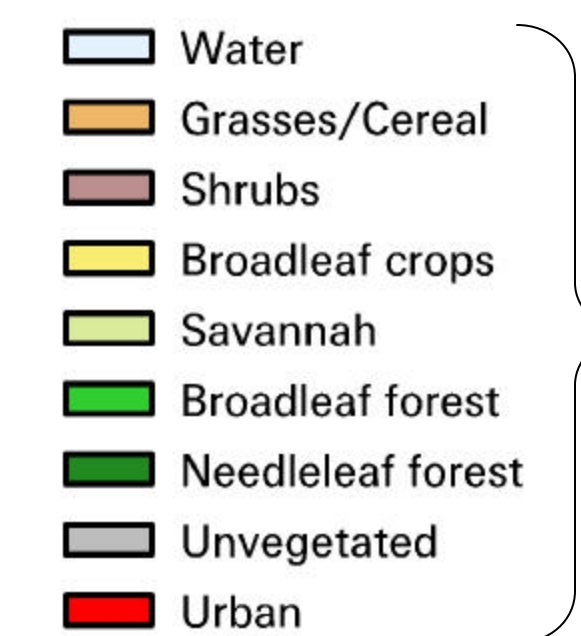


The current STEP global data base is composed of 2300 sites interpreted from Landsat. After extensive quality assurance, screening of outliers, and deletion of problematic sites, MODIS data are intersected with these locations and used to estimate a global classification. Ongoing efforts are directed towards continuing quality assurance and compilation of new sites for ecologically and geographically under-represented classes.

Sample Maps:



MOD12Q1: IGBP



MOD12Q1: LAI/FPAR

MOD12Q2: Global Vegetation Phenology

Identifies Four Cardinal Transition Dates in Growth Cycle

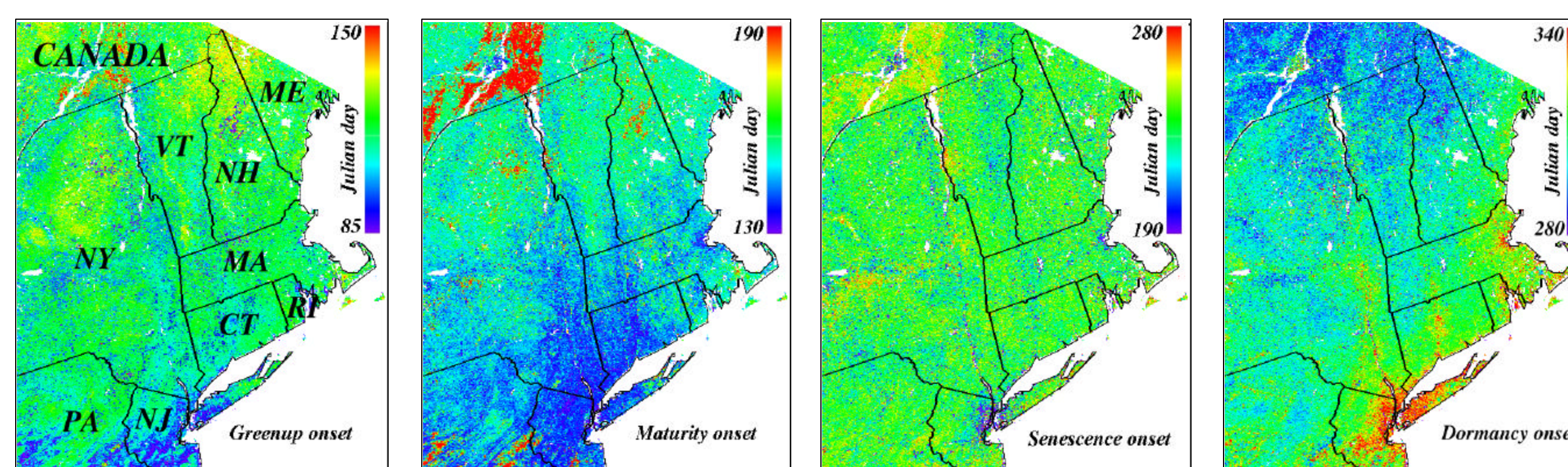
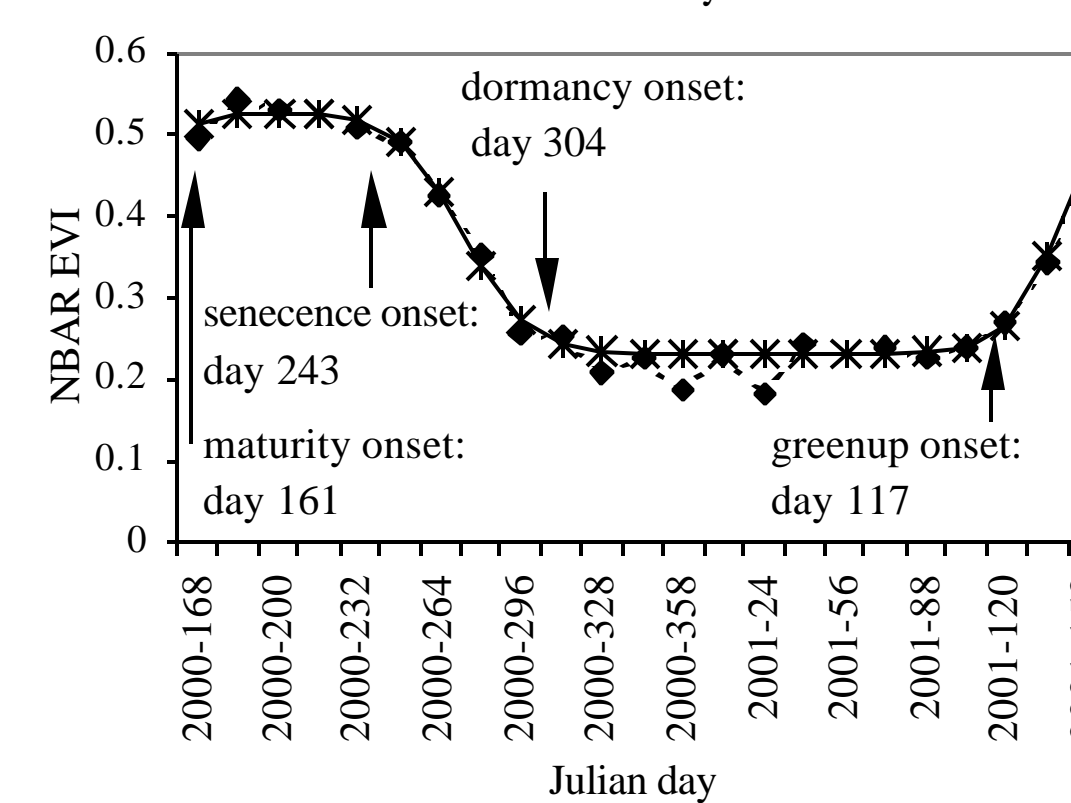
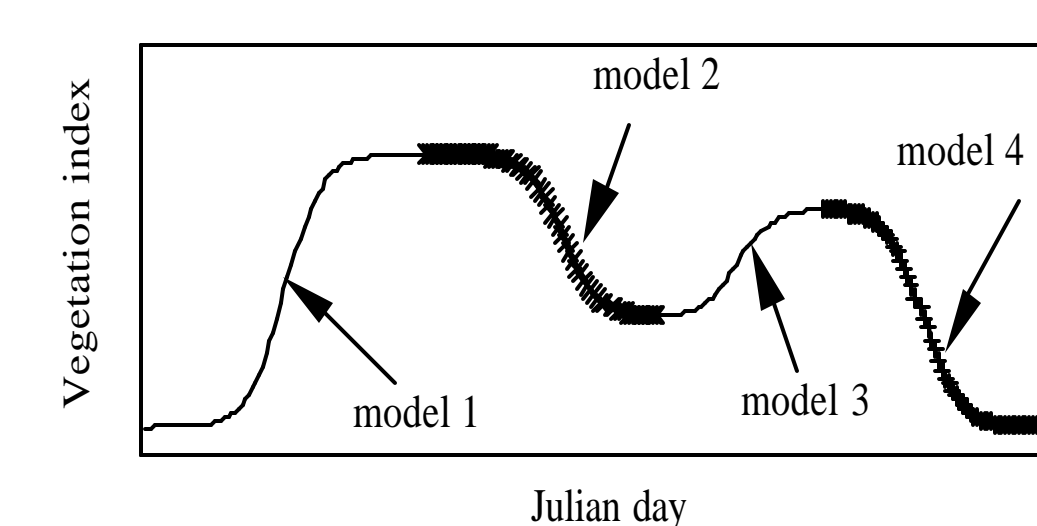
- Onset of greenness, onset of maturity, onset of senescence, and onset of dormancy.

Uses Annual Time Series of EVI

- Computed from NBARS
- 16-day temporal resolution (current)

Method:

- Identify periods of sustained increase or decrease in EVI using moving window
- For each period, fit logistic function
- Transition dates identified as time at which rate of change in curvature is maximum



Regional view of phenology estimated from MODIS in 2001 for the northeastern United States

MOD12Q2: Phenology

