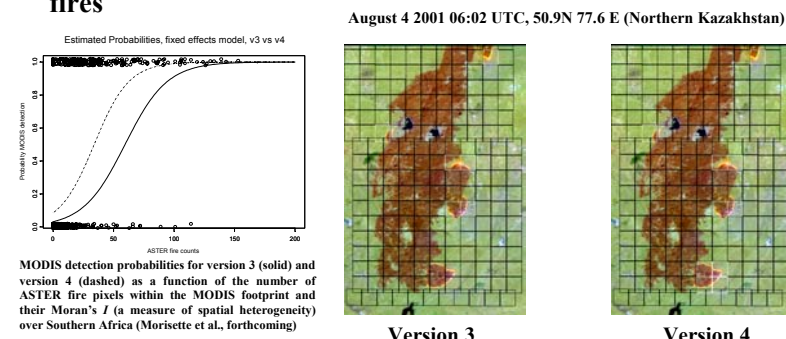


PRODUCT DEVELOPMENT

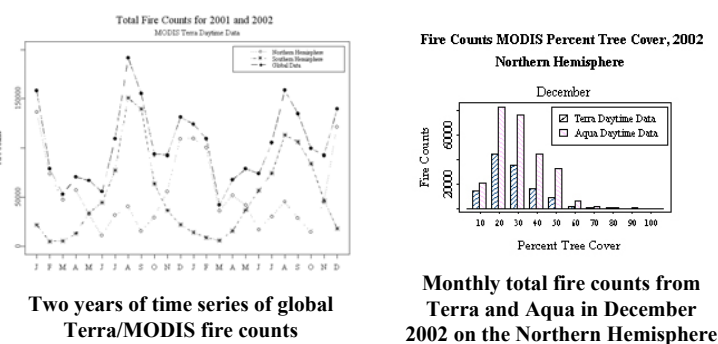
Past accomplishments

- Version 4 algorithm eliminated vast majority of false alarms from hot, bright surfaces
- Higher sensitivity and detection probabilities of true, smaller fires



Present status

- Product accuracy statement available
 - “Stage 1 validation has been achieved through analysis of a small number of ASTER data over selected regions and time periods, combined with simulation results. These results indicate that in many biomes the minimum flaming (~800-1000K) fire size detectable at 50% probability with MODIS is on the order of 100m².”
- Extensive Stage 2 product evaluation is underway
- Users' Guide is being rewritten
- Some known problems remain
 - Small false alarms in urban areas within homogeneous forested regions
 - False alarms along the Indus river from apparent bare soil
- More than three years of homogeneous time series available
 - Initial regional and global analyses of spatial and temporal fire dynamics



Plans for the future

- Version 5 algorithm development
 - correction for urban false alarms
 - threshold adjustments for extreme altitudes
- Continue timely product quality assessment
- Address MODIS band 21 calibration
- Refine MODIS active fire temperature/area retrievals
- Produce database of stationary/permanent fires
- Assist transition to NPP/NPOESS/VIIRS active fire product

References

Giglio, L., Descloitres, J., Justice, C. O., and Kaufman, Y., 2003, An enhanced contextual fire detection algorithm for MODIS. *Remote Sensing of Environment*, 47:1314-1318.

Kaufman, Y., Ichoku, C., Giglio, L., Korontzi, S., Chu, D. A., Hao, W. M., Li, R., and Justice, C. O., 2003, Fires and smoke observed from the Earth Observing System MODIS instrument: products, validation, and operational use. *International Journal of Remote Sensing*, 24:1765-1781.

Justice, C. O., Giglio, L., Korontzi, S., Owens, J., Morisette, J. T., Roy, D., Descloitres, J., Alleaume, S., Petitcolin, F., and Kaufman, Y., 2002, The MODIS fire products. *Remote Sensing of Environment*, 83:244-262.

Morisette, J.T., L. Giglio, I. Csizsar, C. O. Justice, Validation of the MODIS Active fire product over Southern Africa with ASTER data. *International Journal of Remote Sensing*, accepted by guest editors.

PRODUCT VALIDATION

Past accomplishments

- Large sample of ASTER imagery, collocated with MODIS fire pixels was collected
- Stage 1 validation was completed over Southern Africa, South America and Northern Eurasia. Detection probabilities as a function of summary statistics of ASTER fire pixels were determined.

Present status

1. Development of a semi-automated ASTER fire detection algorithm

- Contextual approach to compensate for variability across scenes
- Use differences between fire-sensitive (band 8; 2.295 - 2.365 μm) and fire-insensitive (band 3N; 0.76 - 0.86 μm) reflective bands that are otherwise highly correlated
 - band 8 used to eliminate problems from cross-talk in band 9
- Flexibility to handle different gain settings
- Validation ongoing, visual verification still needed

2. Intensive regional validation study in Brazil

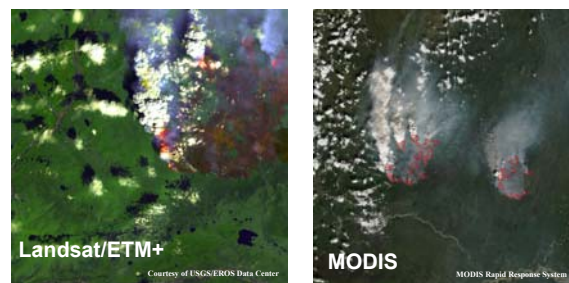
- 3 field campaigns of prescribed burns (total of 6 fires) coincident with Terra overpasses
- Scheduled ASTER collection with low gain
- Aircraft imagery coincident with satellite overpass (2 fires)
- Flaming/smoldering/background thermocouple temperature measurements
- Data used for:
 - ASTER algorithm verification
 - Fire characterization for improved simulations
- Refined statistical analysis of detection probabilities on a sample of 22 ASTER scenes



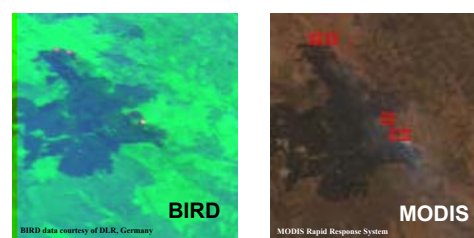
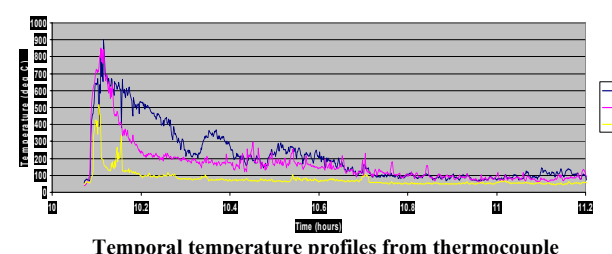
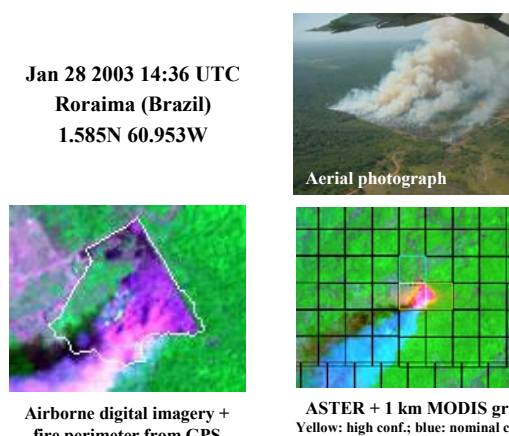
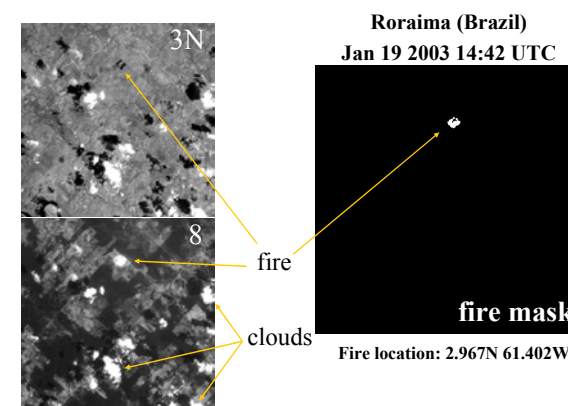
Prescribed fire on October 24, 2003 in Pará (Brazil)

3. Use of collocated data from additional platforms: BIRD and Landsat-7

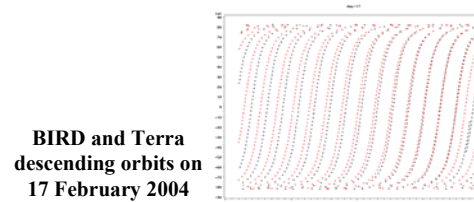
- Preparation for the post-ASTER era
- Multi-platform analysis
- Opportunistic collection of Landsat/ETM+ and BIRD data
- Study of physical and logistical limitations of multi-sensor fire observations



Active fires in Alaska on Landsat/ETM+ and Terra/MODIS imagery on Jun 24 2004



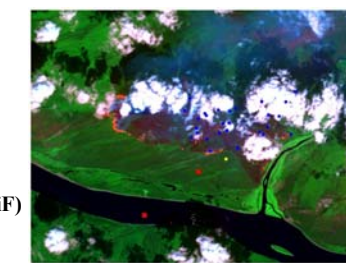
Active fires on BIRD and Terra/MODIS imagery on Sep 11 2002 in NE Australia



4. Regional partnerships through GOCF/GOLD-Fire for MODIS product evaluation

- South Africa (emerging)
- Spain (emerging)
- India (emerging)
- South America
 - Brazil
 - Mexico and Central America
 - Latin-American GOCF network (RedLatIF)
- Australia
- South-East Asia
- Northern Eurasia (NERIN, NEESPI)

■ Avialesobhrana fire locations ● MODIS active fire locations
● MODIS active fire location on the end date of the fire reported by AFPS



ASTER imagery centered at 60.3 N and 116.87 E with active fires on August 1 2002.

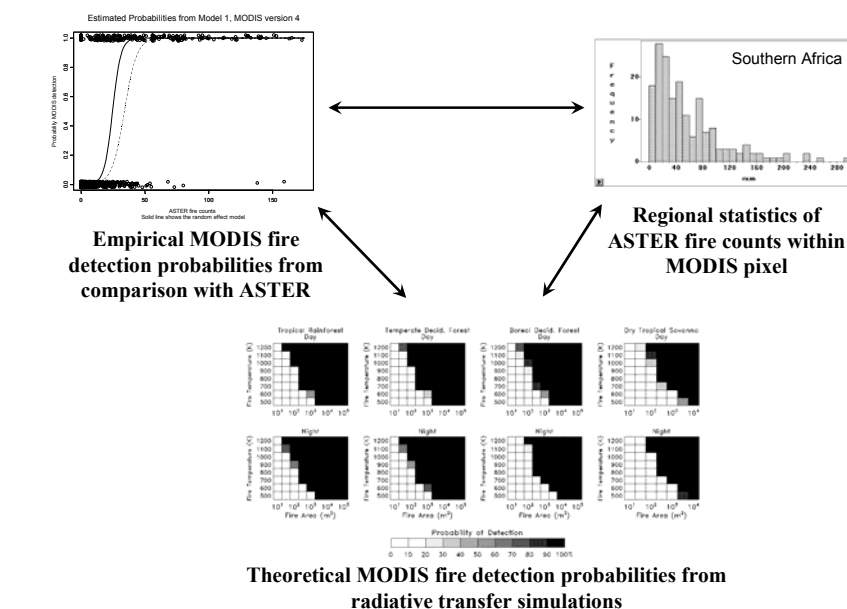
Plans for the future

1. Active fire validation protocol development

- pixel- and event-based validation metrics
- thematic GOCF/GOLD-Fire workshops
 - Brasilia (Jul 04), Fremantle (Oct 04), Moscow (Nov 04)
 - Submit protocol and reporting standards to CEOS LPV

2. Development of realistic simulations

- Comparison on empirical (ASTER) vs. simulated detection envelopes



3. Stage 2 validation

- Collection of ASTER imagery (to complement existing database) – sampling driven by study of global fire distribution, fuel type, known algorithm problems and regional capacity
 - ASTER collection priorities: North America, Australia, Spain, SE Asia
- Refined analyses for regional Stage 2 validation
 - detection probabilities from a large sample of ASTER imagery
 - detection and false alarm rates
 - South America
 - Northern Eurasia, North America
 - Southern Africa, Australia
 - South East Asia, Central America
 - Europe (Spain- Mediterranean)

4. Evaluation of Fire Radiative Power, temperature/area retrievals

- using ASTER and BIRD data
- in partnership with King's College (UK) and DLR (Germany)

Acknowledgments: work presented in this poster was supported in part by NASA grants NAS531365 (EOS Investigation of Global Vegetation), NAG513627 (MODIS Fire Products and Landcover Dynamics in Brazil), NAG512667 (Intercalibration of fire products from AVHRR and MODIS) and NNG04GC82G (Biomass burning observations in Northern Eurasia).