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UTILIZATION OF MULTI-SENSOR ACTIVE FIRE DETECTIONS TO MAP FIRES IN THE US. THE FUTURE OF MONITORING TRENDS IN BURN SEVERITY

M. Coan [a, *], J. Picotte [b], S. M. Howard [c]
[a] Stinger Gharffarian Technologies Inc., Contractor to the USGS Earth Resources Observation and Science Center (EROS), Sioux Falls, SD, USA 57198 – mcoan@usgs.gov
[b] ASRC Federal InuTeq, Contractor to the USGS EROS, Sioux Falls, SD, USA
[c] United States Geologic Survey, EROS, Sioux Falls, SD, USA

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ABSTRACT:

In 2006, the Monitoring Trends in Burn Severity (MTBS) project was established in the United States to address two concerns:

1) develop a methodology to consistently map and assess the effects of fire across the landscape and support land management practices in the context of fire disturbances, and

2) provide a base of information to assess fire impacts and trends and monitor the effectiveness of the National Fire Plan and the Healthy Forests Recovery Act.

Currently, MTBS relies upon state and federal fire occurrence data to guide Landsat scene selection and manual procedures to assess fires. Many fires on private lands are not reported and escape evaluation.

The NASA Applied Sciences Program is supporting the development of automated procedures to increase the efficiencies of MTBS. Active fire detections from NOAA's Hazard Mapping System (HMS) are used to augment existing fire records. Rule based models were developed to detect freshly burned (burn-not burn, or BNB) areas on Landsat imagery. Three Landsat path/rows of our study area cover three national forests in Florida: the Apalachicola, Osceola, and Ocala. The HMS and BNB data identified many undocumented fires. We processed 88,000 HMS points (2003 – 2012) and 1,800 Landsat scenes (1984 – 2013) to identify approximately 300,000 burned area polygons, most of which were smaller than the current MTBS minimum size requirement (500 acres, ~202 ha).

Future improvements will incorporate better access to Landsat archives, a library of rule based models for different vegetative communities, tools to assist scene selection, improved image processing scripts, and database storage of results. All of these changes will enhance consistency of fire assessments and speed product generation. These processing tools and procedures will be implemented with open source software and made available for distribution to interested regional and local land management agencies.

* Corresponding author.