A Comprehensive Approach for Detecting Active Fire over the Southeastern United States

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Abstract

Traditional fire detection algorithms mainly rely on hot spot detection using thermal infra-red (TIR) bands with fixed absolute or relative thresholds, which may generate false alarms over certain surface types and miss small and cool fires. Contextual testing with MODIS fire detection products was recently used to improve hot spots detection. Three solar reflectance bands were used to reject false alarms successfully. Over the southeastern United States, where wildland fires have special patterns, current algorithms can be tuned and improved for more acute detection of active fires, based on identifying surface types and fuel types. In this paper, a comprehensive approach is developed with the synergic use of MODIS TIR bands, selected solar reflectance bands, and surface types. The thresholds are tuned for various surface types based on statistical analysis of fire events in recent years. This approach is validated with fires in Florida during spring 2004. The results show that it can be used to detect small and cool fires effectively.

Keywords: Forest fire; Fire detection; MODIS; Remote sensing