**Quantitative Evaluation of Active Fire Detection Capabilities from VIIRS**

Ivan Csizsar1, Wilfrid Schroeder2, Evan Eliott1, Louis Giglio2 and Christopher O. Justice1

1 NOA/NESSDIS Center for Satellite Applications and Research, Camp Springs, MD
2 University of Maryland - College Park, MD

**INTRODUCTION**

The VIIRS (Visible/Infrared Imaging Radiometer Suite) sensor on board the JPSS (Joint Polar Satellite System) and the NPOESS Preparatory Project (NPP) satellites will provide radiometric data suitable for active fire detection. This paper focuses on the evaluation of active fire detection using primary VIIRS data. The algorithm protocol was developed for the MODIS (Moderate Resolution Imaging Spectroradiometer) sensor, which has a 2.5 km spatial resolution. The VIIRS active fire product will provide 750 m spatial resolution and is expected to be an improvement over MODIS in terms of active fire detection.

**EVALUATION OF SIMULATED VIIRS FIRE PIXEL RADIANCE**

In the absence of independent observation data, the methodology for VIIRS fire pixel radiance simulation was tested by the accuracy to reproduce MODIS radiances. The working hypothesis is that the empirical relationships should be directly applied to VIIRS radiance data for the simulated M13 (3.95 µm) channel. This paper describes a simulation framework using a set of high-quality VIIRS simulator observations by the ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer) and MODIS (Moderate Resolution Imaging Spectroradiometer) sensors on the NASA Earth Observing System Terra and Aqua satellites. These sensors are being used to develop a comprehensive multi-spectral, multi-resolution, multi-temporal fire detection algorithm.

**GLOBAL SIMULATIONS OF VIIRS FIRE PIXEL RADIANCES**

Production of the fire mask requires NIIR (Near-Infrared) and LMR (Landsat Medium Resolution Instrument) observations but can tolerate saturation of either band provided that it occurs with small confidence. The potential impact of saturation on the mask is that it may produce unaggregated VIIRS pixels which do not require re-processing. Post-processing includes an adaptive assignment of potential fire thresholds to better capture small, cool fires and reduce false alarm rates.

**RESULTS**

The technique of active fire detection product validation builds on protocols developed for MODIS active fire validation. The objective is to use fire detection product sets as a proxy to investigate fire detection algorithm performance, fire detection levels and detectability limitations of different sensors. In this paper, we assess the performance of the VIIRS active fire detection product against MODIS active fire detection product.

**SIMULATION OF VIIRS FIRE PIXEL RADIANCES**

VIIRS (Visible/Infrared/Imager/Radiometer Suite) is a major instrument on board the JPSS satellites. The VIIRS active fire algorithm is based on the Collection 6 MODIS algorithm and is designed to provide a 250x750 m spatial resolution fire product. This paper describes the methodology and results of the VIIRS active fire algorithm compared to MODIS active fire detection for the year 2010.

**REFERENCES**

[1] MODIS Collection 6 algorithm release note
[2] Landsat Class sensors provide fine detail quality data although coverage is limited. Landsat-class sensors adapted to Landsat TM and ETM. ASTER is coincident with MODIS/Terra near nadir pixels (10.76 µm) measurements, aggregated from the native resolution observations into medium resolution pixels according to a scheme aimed at reducing the decrease of spatial and temporal resolution.

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