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## SNPP VIIRS AF & PGRR Background

The Active Fire (AF) product is one of the operational environmental data products generated from the Visible Infrared Imaging Radiometer Suite (VIIRS) sensor on the Suomi National Polar-orbiting Partnership (SNPP) satellite and has demonstrated to be critical for disaster and resource management, specifically wildland fire incidents.

The Proving Ground and Risk Reduction (PGRR) project was created to maximize the benefits and performance of NOAA's satellite assets with the primary objective of the VIIRS AF PGRR project being to improve AF data, algorithms, and products for downstream operational and research users. The process includes product evaluation, validation, and improvement while collaborating with the wildland fire user community to develop product understanding, dissemination, and ultimately to leverage the VIIRS AF products for active and post-fire management. This poster provides an overview of our efforts.

## Outreach

As the VIIRS AF product has become more visible to the research and operations community there has been greater urgency to engage the end-users. Discussion with end-users has focused on several components, including such basic information as spatial resolution, sampling aggregation and sources to obtain the product(s). In addition, explanation of the similarities and differences with the MODIS sensor and AF product has been necessary to aid in the transition to VIIRS.

- Our **website** (Fig. 1) has proven successful for disseminating product and sensor information, data, imagery, and covering FAQs
- We have given numerous **presentations** and had opportunities to meet with both research and operation users of remotely sensed active fire data, for example:
  - Research Community: AMS, EUMETSAT, GOFC-GOLD, the NOAA Satellite Science conferences, and the JPSS Proving Ground Seminars.
  - Operations: IMET and FBAN workshops, NIFC Predictive Services meeting, and Northern California GACC IMT meeting

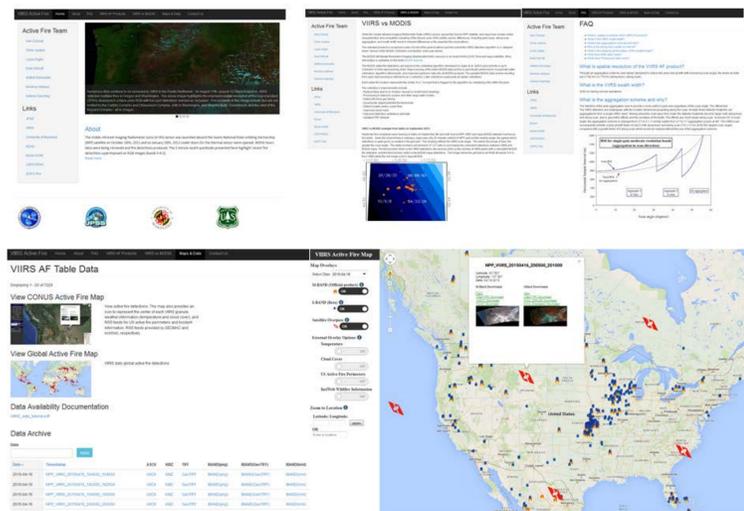


Figure 1: VIIRS Active Fire website (<http://viirsfire.geog.umd.edu>) showing the home page, data and map page, FAQ page, and VIIRS-MODIS comparison page.

## On-site visits

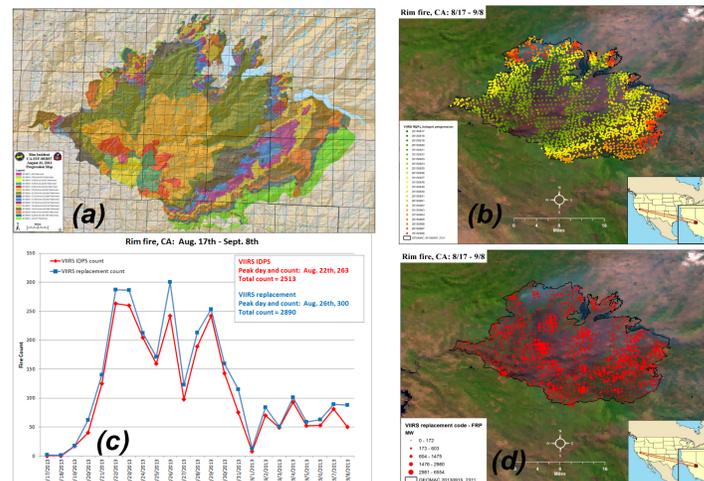
Visits to fire incidents and coordination centers has given us an opportunity to observe how operations personnel manage fire events (e.g. resources, data, weather, etc.) and perspective on the pressures they are under. In addition it has allowed us to observe what data and tools they use and solicit feedback on applications, needs, and wants of remotely sensed data for situational awareness. Finally, these visits offer us a chance to education users about remotely sensed fire data, particularly VIIRS

- 2013 we visited the West Fork (Fig. 2) and Rim fires (Fig. 3)
- 2014 we visited the Northwest Coordination Center (NWCC) in Portland, Oregon and the National Interagency Coordination Center (NICC) at the National Interagency Fire Center (NIFC) in Boise, Idaho. The northwest saw a particularly active 2014 fire season (e.g. Fig. 4).

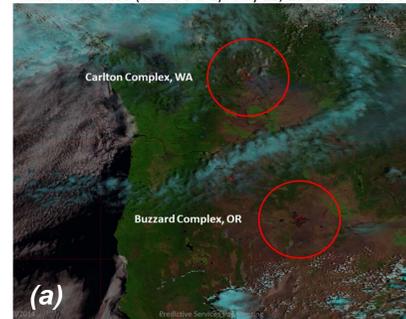
Figure 2: On-site visit to the West Fork Complex in Colorado, June 2013. Images show some of the personnel we were able to "shadow" proving opportunities to discuss user needs and wants for satellite-based fire data.



Figure 3: (a) Official fire progression map as of August 31, 2013; (b) VIIRS M-band detections showing fire progression Aug. 17 – Sep. 8; (c) Evaluation of the IDPS and "replacement" AF product; (d) VIIRS replacement product's Fire Radiative Power (FRP)



VIIRS I-band RGB (bands 3-2-1): July 18, 2014 at 2015 UTC



VIIRS I-band RGB (bands 3-2-1): July 18, 2014 at 2015 UTC



Figure 4: (a) VIIRS I-band (375m) false-color images and fire detections for just two of many large incidents in the northwest in 2014; (b) zoomed image of the Carlton Complex

## Evaluation and Validation

Evaluation of the VIIRS AF product has included participation in prescribed fires working closely with US Forest Service personnel. This opportunity also provided USFS personnel hands on experience with using VIIRS AF data while allowing us to educate them about overpass timing, spatial and temporal resolution, detection capabilities, and fire characterization. We conducted satellite validation using *in situ* radiometers to measure radiant flux density and fuel consumption rates. Similar experiments were also performed in the laboratory (Fig. 4).

Similar prescribed fire research in Kruger National Park, South Africa, provided opportunities to evaluate the detection capabilities and accuracy of the VIIRS AF product while engaging members of the Southern African Fire Network (SAFNet) and provide presentations about the VIIRS AF products (Fig. 5). In addition, Direct Broadcast (DB) VIIRS AF data continues to be evaluated to ensure consistency with the standard VIIRS AF product from CLASS

Figure 4: Photo examples of VIIRS AF evaluation and validation efforts from a prescribed fire (Rx) in George Washington National Forest (GWNF), Virginia, with in situ, tower-based radiometers and laboratory experiments performed at the University of Maryland to validate our radiometers

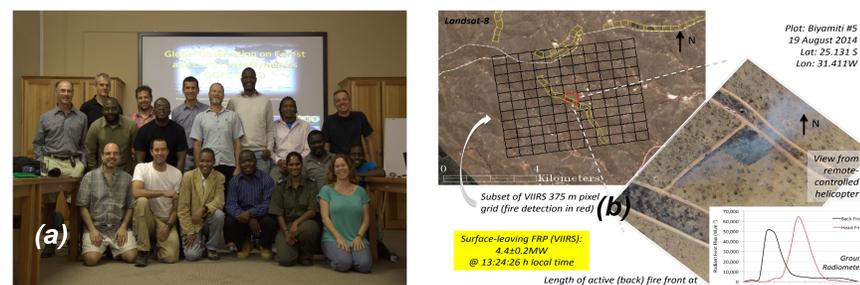


Figure 5: (a) Members of SAFnet and researchers from various institutions meeting to discuss satellite data for fire monitoring while taking a break from the validation field campaign (b) titled: "Validation of satellite active fire data sets using coincident prescribed fire opportunities in Kruger National Park"

## Conclusion

As the VIIRS AF product matures and becomes more visible to end users, greater outreach is needed to inform them of the product's behavior, format, accuracy, and similarities and differences with current remotely sensed active fire products such as MODIS. In addition, product evaluation and validation is ongoing to assess the fidelity of the data. These efforts have seen great success when coupled through fire experiments and prescribed fires as both education and evaluation/validation can be achieved simultaneously.

### Acknowledgment

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