Implementation and support of a VIIRS Near-Real Time Rapid Fire System for Fire Monitoring at the US Forest Service

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I. Csiszar, E. Ellicott, W. Schroeder, L. Giglio, K. Vadrevu and C. Justice

The Visible Infrared Imager Radiometer Suite (VIIRS) on the Suomi National Polar-orbiting Partnership (NPP) satellite launched from Vandenberg Air Force Base at 0548 EDT on Oct. 28, 2011 and first-light shortwave data began to be transmitted on November 21st, 2011. After some delay, due to degradation of observed radiances in the visible and NIR bands, the thermal cooler doors were opened January 18th, 2012 and by the following day Suomi-NPP was acquiring its first fire detections.

The current VIIRS active fire (AF) algorithm is based on an earlier version (Collection 4) of the MODIS algorithm, therefore lacking the improvements developed, tested, and implemented in the Collection 5 and Collection 6 MODIS algorithms. In addition, the VIIRS AF product does not contain a spatially-explicit fire mask, fire radiative power, and additional fire retrieval details; standard data delivered with the MODIS AF product. Coupled with these differences between MODIS and VIIRS is that user readiness for the VIIRS fire product is currently limited due to contractual restrictions, uncertainties regarding sensor performance, and delays arising from the transition of the NPOESS program to JPSS.

Therefore, in order to minimize the interruption in data continuity between MODIS and VIIRS, the VIIRS active fire science team has developed a processing chain to automatically download, ingest, and generate evaluation test data for end-users, such as the USFS. We are developing a web-based user interface to provide selected data testers access to value-added mapping/visualization products that display the IDPS-generated VIIRS fire detection data. The website offers side-by-side comparisons of MODIS and VIIRS for selected fire incidents in the U.S., and will eventually offer comparisons with the updated VIIRS algorithm (based on MODIS collection 6 adapted for VIIRS). A database to catalog and store initial user feedback has been created which will inform and support any necessary adjustments into the IDPS operational algorithm. Finally, we are working with the GOFC-GOLD Regional fire networks to identify end users to engage in the evaluation and feedback process.

It is our goal that improvements to the AF product will eventually include a fire mask with flagged fire pixels and corresponding detection confidence, as well as other relevant pixels (e.g. clouds); pixel-level QA, and fire-pixel radiometric and algorithm information. We also foresee adding fire specific information and characterization such as brightness temperature, and fire radiative power (FRP). These improvements would reduce the latency in end-user product adoption and increase the continuity with current AF products, specifically MODIS.