

Estimating Fire Emissions Using Visible Infrared Imaging Radiometer Suite (VIIRS) Nightfire Data and the Fire INventory from NCAR (FINN)

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We are developing a new method to estimate fire emissions using nighttime data collected by the Visible Infrared Imaging Radiometer Suite (VIIRS) on board the Suomi-National Polar-orbiting Partnership satellite, in conjunction with the Fire INventory from NCAR (FINN). The VIIRS NightFire (VNF) system is designed to detect and characterize sub-pixel combustion sources at night. VNF was originally developed for detecting gas flares and estimating their emissions. VNF employs a multispectral approach to detect hot sources and uses Plank curve fitting to derive combustion parameters such as temperature, source size, and radiant heat. We have noticed that it also detects other combustion events with relatively low combustion temperature that could be attributable to wildfires. In this work, we leverage combustion source size reported for each combustion event to estimate burnt areas and then calculate wildfire emissions using FINN. Although VNF data is limited to nighttime, we expect that VNF will help us to identify small fires, which we often have difficulty detecting, which will improve our overall fire emission estimates.

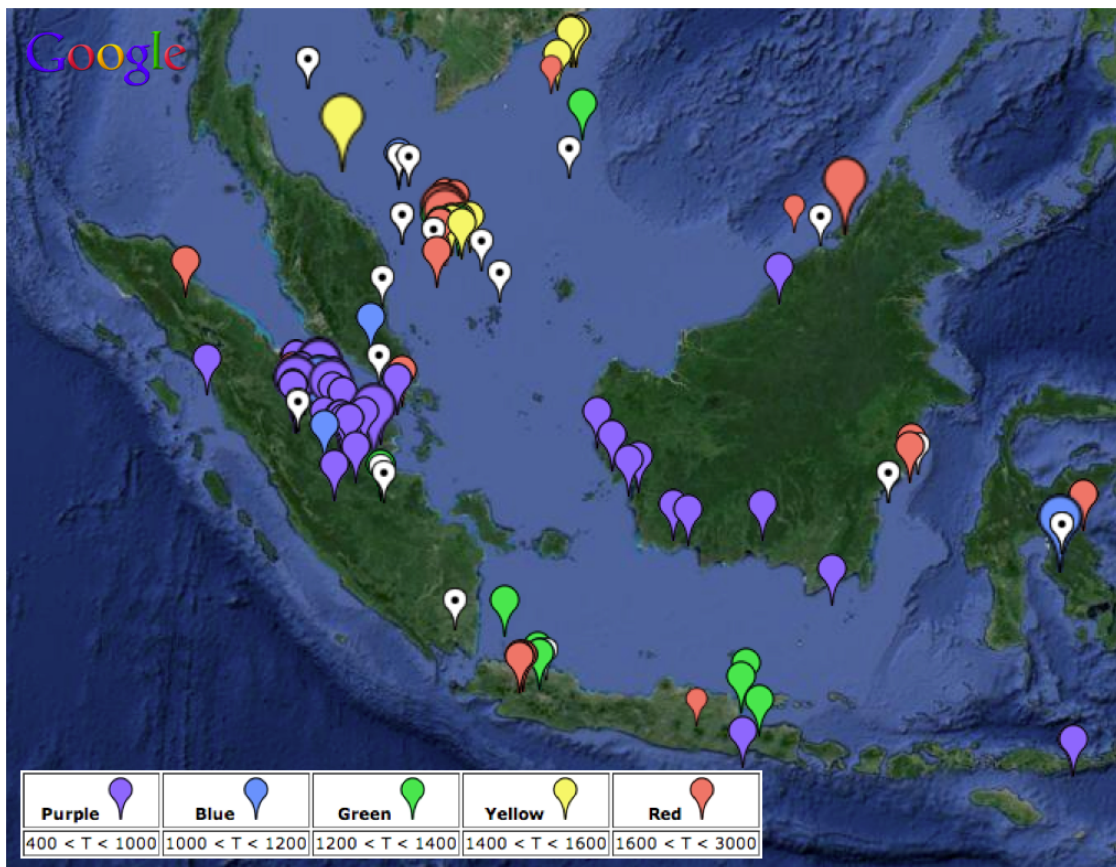


Figure 1. Combustion events detected by VNF over South East Asia (27 June, 2013). Note white placemarks indicate non-conforming detections.