VIIRS active fire detection in Siberian boreal forests

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The Visible Infrared Imaging Radiometer Suite (VIIRS) on the Suomi National Polar-orbiting Partnership (S-NPP) satellite provides 12h global coverage at spatial resolutions of 375 m and 750 m. Current operational VIIRS Active Fire Product builds on the Moderate Resolution Imaging Spectroradiometer (MODIS) Collection 4 fire algorithm applying the similar combination of tests to the corresponding VIIRS 750 m data. This study investigates the application of VIIRS fire detection approaches based on 750m and 375m data in boreal forests of Siberia. VIIRS active fire detection product is compared to current Terra/ Aqua MODIS 1 km active fire product (MOD14/ MYD14) and Landsat-8 images are used for visual interpretation of areas containing active biomass burning. We utilize two VIIRS active fire products: based on MODIS Collection 6 algorithm for 750m data, and based on fire algorithm for 375 m data proposed by Schroeder et al. (2014). Both day and night fire detections are used for the analysis. In the present study we consider large fires complexes in the Eastern Siberia which burned for several weeks in July and August of 2014. We perform the comparison using 0.25 x 0.25 degree grid on a daily basis. Another objective of this study is to investigate the consistency of fire radiative power (FRP) retrievals between MODIS active fire product and VIIRS active fire product and to include VIIRS data into fire radiative energy (FRE) calculation which is related linearly to the total biomass consumption and pyrogenic emissions.