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New generation of NPP-VIIRS sensor contribution to burned area mapping in Brazil

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Vegetation burning is a global-scale process that affects the global distribution and structure of vegetation, major biogeochemical cycles, and the climate system. During the last decades, the Brazilian savanna has been increasingly affected by deforestation due to cropland and pasture expansion, consequently rising and altering the natural fire regime in the region. Accordingly, there is a noticeable need to understand fire regime in Brazil, in particular, by analyzing currently temporal and spatial patterns of burned areas. Over last two decades, the use of remote sensing has allowed unprecedented advances in mapping fire dynamics, especially for locating fire occurrence in time and space and quantifying the total extent of area burned. Several studies relied on the use of remote sensing to map burned areas at a global/regional scale, however there are still discrepancies among the currently products and many limitations. The Visible Infrared Imaging Radiometer Suite (VIIRS) provides data in 375 m and 750 m space resolutions, improving coarser resolution sensors. VIIRS sensor is aboard the Suomi National Polar-Orbiting Partnership (S-NPP) satellite, released in October 2011, and the NOAA-20 satellite, launched in November 2017. Both satellites are part of JPSS Mission, which one the main purposes of this sensor is to continue and also to enhance the Earth long-term monitoring initiated by Advanced Very High Resolution Radiometer (AVHRR) and the Moderate Resolution Imaging Spectroradiometer (MODIS) sensors. This work aims to adapt the automatic MODIS burned area algorithm (AQMMODIS) to the VIIRS sensor and then to evaluate its performance over the Brazilian Cerrado. The procedure relies on daily information of Near Infrared and Middle Infrared reflectances and active fires from VIIRS. An assessment of the accuracy of the algorithm was conducted for the year 2015 during the fire season (July and August) using as reference fire scars derived from Landsat 8 OLI. The preliminary results show a better discrimination of burned areas when compared to the currently MODIS products with fewer commission errors, due to higher spatial resolution and better geolocation of VIIRS sensor (375m).

Keywords: VIIRS, burned area, fire, burn index.