Nat. Hazards Earth Syst. Sci. Discuss.,
doi:10.5194/nhess-2017-90-RC2, 2017

Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Analysis of fire dynamics in the Brazilian savannas" *by* Guilherme Augusto Verola Mataveli et al.

Anonymous Referee #2

Received and published: 12 April 2017

This work addresses an important subject that is the analysis of fire occurrence in the Brazilian Savannah using active fire and burned area information and the relation with climate variables. Accordingly, the authors try to characterize fire regime using vegetation and precipitation data. While the topic is appropriate for NHESS, I cannot recommend because the paper does not show enough novelty, as it is a research based on previously published results without even mention some of them. The authors must be careful when talking about the lack of such specific studies. In fact, there are some studies that show the spatial and temporal patterns of fire and relation between fires and climatic variables in Cerrado. The authors should see the authors they mention (Moreira et al 2012, 2015; Pivello, 2011,) and also papers listed below: The work of Libonati et al., 2015a shows that the intra-annual variability of burnt area over the Brazilian woody savannah mostly relates to the seasonal regime of precipitation.

These authors also show that there is a marked dry season from May to September, characterized by very low precipitation amounts and that, during the dry period, there is a steady displacement towards higher values of the median, lower and upper quartiles and extremes of the distributions of monthly values of burnt area. It is worth mentioning that the manuscript uses the same precipitation data from Libonati et al., 2015a. The work of Libonati et al., 2015b analyzed the results of three currently burned area products derived from MODIS data, namely AQM (INPE), MCD45A1 (NASA) and MCD64A1 (NASA). The procedure is applied to quantify the overall temporal and spatial distribution patterns of burned areas in Brazil for the period 2005 – 2010 and obtained patterns are compared for each Brazilian biome and related to the respective patterns of fire pixels derived from remote sensing. The Cerrado biome was found the one with the largest BA, followed by Caatinga and Amazônia. Estimates of BA over Brazil from AQM, MCD45 and MCD64 products for the period present a similar inter-annual variability. In addition, the work of Libonati et al., 2016 allows analyzing the overall temporal and spatial distribution patterns of BA for the last decade. The highest monthly mean amount is observed in September, followed by October, and March presents the lowest amount. The most severe year is 2007, followed by 2005 and 2010; 2006 and 2009 are the years with less area burned, followed by 2008. The spatial pattern of BA shows that the north region of Cerrado presents the highest frequency of occurrence. The intra and inter-annual variability of BA over Cerrado are closely related to the variability of precipitation but it is worth emphasizing that, despite the major role played by climate conditions, the human factor has also a prominent role on fire dynamics in this region and cannot be disregarded. Accordingly, all the results shown in the manuscript were previously reported by the above studies. However, all these references are missing and the authors argue the novelty of their work. Moreover, I think that there is a gap in the literature review. For instance, the work of Veraverbeke et al., 2014 is no about social and economic costs of fires, but on remote sensing techniques aiming fire severity assessment. In addition, the authors argue the efficiency of MCD45A1 product for mapping and understanding fire behavior and its im-

pacts in the Cerrado. These results are not in agreement with previous works such as Roy et al (2008) and Libonati et al. (2015a), who have pointed out an under-detection of BA by the MCD45 product in savannas regions of Brazil.

Moreover, some conclusions are not based on the results: 1) 'Nevertheless, the annual variability of hotspots and precipitation and between burned area and precipitation during the 2002-2015 period is evidenced.' 2) Besides the seasonal modulation by precipitation, fire occurrence seems to respond to its interannual variability. Drier (wetter) years are associated with more (less) fires in the studied area. There is no clear evidence in the manuscript, despite visual comparison, about the statistical significance of this relation.

The authors say in the conclusions that 'The methods applied are easily implemented and can be used for analyzing the occurrence and dynamics fires in different areas of the globe'. I don't think this work shows a 'method'. Instead, it is mainly devoted to a spatial and seasonal description of available variables.

1) Libonati, et al., 2015a. An Algorithm for Burned Area Detection in the Brazilian Cerrado Using 4 μm MODIS Imagery. Remote Sensing. , v.7, p.15782 - 15803. 2) Libonati, et al., 2015b. Spatio-temporal variability of burned area over Brazil for the period 2005-2010 using MODIS data In: XVII Simpósio Brasileiro de Sensoriamento Remoto, 2015b, Joao Pessoa. XVII Simpósio Brasileiro de Sensoriamento Remoto. 3) Libonati, et al., 2016. Spatial and temporal patterns of burned area over Brazilian Cerrado from 2005 to 2015 using remote sensing data In: European Geosciences Union General Assembly 2016, 2016, Vienna. European Geosciences Union General Assembly 2016.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., doi:10.5194/nhess-2017-90, 2017.