EGU22-10772
https://doi.org/10.5194/egusphere-egu22-10772
EGU General Assembly 2022


# The impact of heat waves in forest fires over the Amazon rainforest

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Wildfires have become an imminent threat to ecosystems, consequently leading to economic loss and generating negative impacts on population health. Considering IPCC's projection of a significant increase in the frequency of these events, it is important to understand which conditions lead to a fire intensification, as recently happened in California, Australia, and Brazilian Pantanal. Some of the greatest wildfires registered in North America and in Europe occurred in concomitance to intense heat waves and drought events. The lack of a comprehensive understanding of the physical mechanisms associated with extreme wildfire events in the Amazon rainforest, underlines the current inability to properly prevent them. Therefore, this study aimed to identify the role of extreme temperature events, such as heat waves (HW), in forest fires behaviour in the Brazilian Amazon during extreme drought years. The relationship between wildfires and HWs was hereby analysed during both dry and wet years in the Amazon Forest, in order to understand the association between different time and spatial scale events in forest fires magnitude. Accordingly, CPC/NOAA reanalysis data of daily maximum temperature between 1979 and 2019 were used as input to determine HW events in a multi-method global heatwave and warm-spell data record and analysis toolbox[1]. A standard HW definition was applied, where an event corresponds to at least three consecutive days in which the maximum temperature exceeds the 90th percentile for that day. Wildfire magnitude analyses were calculated through active fire (AF) and fire radiative power (FRP) data from MODIS C6 sensor, obtained at FIRMS/NASA for the comprehended period between 2003 and 2019. Spatial intensity of HW was classified and then confronted with precipitation anomaly in both normal and dry years. Also, statistical comparison of fire magnitude (i.e., AF and FRP) in HW and non heat wave (NHW) days was analysed to measure extreme temperature events impacts in wildfire. Results showed a significant increasing trend in HW occurrences in recent decades, with peaks in known drier years. An increase of AF counting and fire intensity was noticed during HW events. This latter effect appears even when the HW occurs during extremely dry seasons, such as happened at the Amazon Forest in 2005, 2010 and 2015. Extreme values of AF and FRP were a quarter higher in 2005, doubled in 2010 and tripled in 2015 at HW days when compared to NHW days.

References

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Acknowledgements

This study was supported by FAPERJ project number E26/202.714/2019. L. N. was supported by CNPq PIBIC number 160099/2021-8.