



VIII Scientific Wallace Conference

Proceedings



**Review
and
editing**

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Understanding fire regime across the Gran Chaco Americano

Abstract

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Fire is a natural element in the Gran Chaco, one of the last remnants of tropical dry forests worldwide and a global deforestation hotspot. However, fire has become a critical hazard in recent years, given its increased dynamic and unprecedented negative impacts. These impacts have reached native indigenous peoples that inhabit the region. The Gran Chaco is an essentially diverse cultural region, and those who inhabit it maintain strong ties with the environment, their main livelihood, and their food source. However, little is known about how fire affects these vulnerable communities and how to tackle wildfires in this ecoregion. Therefore, we developed a spatiotemporal analysis of fire activity based on different fire regime components to understand the fire behavior across this region. To do this, we used remote sensing data from MODIS product collection 6 and the MOSEV database to compute the frequency, area, severity, and time since the last fires during the last two decades. We then selected the K-means cluster method to combine these variables using different configuration groups to build up pyrozones. Afterward, we studied the causes of fire incidence during the same period using three predictive modeling algorithms, namely Random Forest (RF), Generalized Linear Model (GLM), and Generalized Additive Model (GAM), to relate climatic, topographic, and anthropic variables with fire occurrence to identify key drivers of recent fire activities. We found four different clusters that show well-defined spatially-aggregated groups, where the variables describe the gradient of the fire dynamic.

Moreover, we found that maximum temperature, livestock, and tree cover percentage were the most critical drivers in defining the fire pattern across this landscape. Our results contributed to a better understanding of the Gran Chaco Americano fire regime. According to current fire dynamics, this information helps us identify critical zones for the most vulnerable communities, like indigenous people that inhabit the Gran Chaco Americano, and contributes significantly to fire management in tropical dryland ecosystems.

Keywords: fire regime, severity, frequency, burned area, pyrozones