Linking research and management: studying the fire regime of Caatinga-Cerrado ecotone (Piauí, Brazil) to propose orientations for policymakers of protected areas

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ABSTRACT – The study of fire regimes in seasonal semiarid ecosystems can improve the understanding of fire dynamics and help to establish orientations for management. With this purpose, we aimed to evaluate seasonal and annual patterns of fire occurrence and recurrence, and the spectral response of the vegetation in the Capivara-Confusões Mosaic of protected areas, located in the transition between Caatinga and Cerrado ecosystems of northeastern Brazil. We characterized fire occurrence from 1999 to 2017, delineating fire scars in 306 Landsat images. Fire seasons were separated in rainy seasons, and early, middle and late dry seasons, by analyzing daily precipitation anomalies. In the 19-year long period considered, 48% of the area was burned, 36% of the fires occurred during the middle dry season, while similar dimensions were burned during the rainy and late dry seasons (4 and 7%, respectively), and there were almost no fires in the early dry season. Four months after the end of the rainy season, between September and October, begins the more risky period that extends until December. Control and mitigation actions should be increased in these months of the middle dry season, and continue during the late dry season and first months of the rainy season, even after the beginning of the rains. Great biomass accumulation during one or more wet rainy seasons, followed by a poor rainy season (sometimes related with droughts) that leads to low water content in the accumulated biomass, increases the chances of large burned areas in the subsequent dry season, and thus reinforced monitoring is highly recommended to avoid big fires. Areas with recurrent fire in the period were always burned with at least one fire-free year in between, and were mostly located near to roads, settlements or cities, and limited by topographic barriers. This spacial distribution could help to implement prevention and punishment actions to reduce the use of fire during high-risk periods. Furthermore, we found that the Caatinga-Cerrado ecotone vegetation has a sensitive spectral response to seasons and fire, which suggests that automatic methods for fire detection that integrate spectral indices could also be implemented for management in this area.

Keywords: Capivara-Confusões Mosaic; management; seasonality;spectral response

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