

Impacts of future climate on burned area over Cerrado-MATOPIBA

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ABSTRACT – Cerrado, one of the most important biodiversity global hotspots, is currently the main contributor to Brazil's annual burned area and, as a fire-dependent biome, it relies on fire to shape its vegetation distribution and structure. MATOPIBA, a region in North-eastern Cerrado, is the most recent agricultural frontier of Brazil and one of the last regions where its native vegetation cover is mostly undisturbed. Although vast areas of Cerrado have been shown to present a negative trend in burned area over the last 18 years (2001-2018), burned area in several microregions of MATOPIBA has been found to be increasing. Furthermore, future climate projections for Cerrado suggest an increase in meteorological fire danger over the 21st century, as a result of higher temperature, lower relative humidity and changes in precipitation regimes. As such, it is crucial to understand how fire activity, and related burned area, is expected to behave in these vulnerable regions when subject to a rapidly changing climate. We present and discuss future trends of meteorological fire danger and burned area in the MATOPIBA microregions focusing on those presenting positive trends in burned area. For each selected microregion, statistical models are developed that relate burned area with meteorological fire danger. Meteorological information derived from the historical run of a regional climate model is calibrated to observation-based products and these results, along with the statistical models, are then used to project burned area for the period 2020-2050 when the regional climate model is run for different climate scenarios. Particular attention will be devoted to the business-as-usual scenario (IPCC's RCP 8.5) as well as to the stringent mitigation scenario (IPCC's RCP 2.6), equivalent to the global 1.5°C warming goal established by the United Nations. Results obtained will provide stakeholders on how burned areas might evolve in MATOPIBA and are expected to assist managers in setting up adequate fire policies contributing to protect this especially sensitive and ecologically important region.

Keywords: Cerrado; MATOPIBA; burned area; fire danger; future projections; climate change

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