The propagation of fire in the National Park of the Chapada Diamantina in 2008: An analysis using the influence of Landscape Units

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ABSTRACT – Forest fires have become increasingly frequent in different ecosystems around the world. In a situation of mega-fires like the one that destroyed part of the Chapada Diamantina National Park (PNCD) in the year of 2008 this process became a strong threat to the biodiversity and ecossytems. The aim of this study was to analyze the behavior of fire in the different landscape units (LU) of this Park and its application in the modeling of fire propagation in the area. Therefore, we applied the weighted average inference method, based on the literature and local knowledge, for joining maps of variables that influence the spread of fire in the study area, namely: the use and land cover, the slope of the terrain, the orientation of the slopes and the drainage system network. As a result of this procedure, we obtained a weighted matrix in which we observed the variables inserted, the respective weights assigned to them and their characterization. Then, in order to evaluate the fire propagation efficiency of the LU, we used the polygons generated based on the European Forest Fire Information System (EFFIS). This dataset was overlaid with LU map, and provided an independent metric of fire propagation for the study area. The LU data integration result generated five classes, from very low to very high fire propagation efficiency. We quantified that the LU with moderate fire propagation efficiency predominates in the study area, covering a total of 72,977 hectares, about 50% of the park. On the other hand, the LU with low fire propagation efficiency covers only 7% of the Park's extension, about 10,628 ha. The presented results were satisfactory demonstrating that the applied methodology was effective for the definition of the factors that influence fire propagation behavior, as well as their respective degrees of influence, as the EFFIS data were in accordance to the LUs defined here. Secondly, the identification of the regions which present higher propagation efficiency is a key information to subsidize the park managers for planning mitigation and combat actions in the case of wildfires.

Keywords: Forest fires; landscape units; propagation model