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Pantanal's 2020 fire season in perspective: the case of a natural heritage reserve

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Pantanal saw a catastrophic fire season in 2020, with a quarter of the biome hit by flames (around 4 million ha). Protected and indigenous areas burnt entirely, and it is estimated that at least 17 million vertebrates died, including several endangered species endemic to the biome. These dramatic events drew attention to the occurrence and aftermath of fire within a fire-sensitive ecosystem such as Pantanal's wetlands.

The RPPN (Reserva Particular do Patrimônio Natural) SESC Pantanal was one of such protected areas severely affected in 2020, with around 2/3 of its territory burnt. Here, we analyse the historical fire behaviour within the RPPN, including the 2020 events, using remote sensing products over the 2001-2020 period.

Although fire has historically occurred within the RPPN at an average of 2 400 ha burned per year, the 2020 fire events were an absolute outlier with more than 70 600 ha burned. Before 2020, only 2010 reached above 10 000 ha of burned areas, and the most extreme events were found to be those above 3 000 ha. When considering the 2001-2019 period, wetlands and grasslands are the land cover types that burn the most (52 and 17% of the total burned area, respectively), followed by forests and savanna formations (16 and 9%, respectively). The year of 2020, however, changed this pattern: most burned areas occurred in forested areas (40%), followed by grasslands (26%) and savanna formations (24%). We also found that fire is not recurrent: during the 19 years of historical data the vast majority of burned areas occurred only once (60%), 35% burned up twice or thrice, and solely 5% burned more than 3 times.

Future climate change assessments seem to point at a warmer and drier future for the biome, when events such as 2020 might become more regular. Our results provide an historical characterization leading up to the 2020 fires within the RPPN SESC Pantanal, that may be of use for fire managers in light of future climate change.