

**Suggestions for revision or reasons for rejection (will be published if the paper is accepted for final publication)**

Reviewer comments - in black

***Authors Reply (R):- in blue***

The paper now address a concise scientific question with very good analysis and excellent plots. Scientifically it is ready for publication. I have no issues with the study, the plots, the conclusions or the structure of the paper. It is really excellent.

But, the writing itself is weak. I started to compile a list of issues, but this only scratches the surface. I understand what the authors are saying, but many times I have to read the sentence twice to get the information. Because of the writing, I would not categorize the paper as acceptable 'as is'.

***We would like to express our gratitude to Dr. Remer for her careful reading and relevant contributions to the improvement of this manuscript. We recognized their relevance and accepted all the recommendations and suggestions.***

**Q1. Lines 14-16.** Aiming to contextualize the regional and Pantanal burning seasons, the present study analyzes fire counts and smoke over Pantanal, Amazonia and Cerrado in 2020 with the previous seventeen years (2003-2019). Sentence doesn't make sense.

**R: The sentence was adjusted (as can be seen below) to express in clearer way the goal of the manuscript (See manuscript new clean version Lines 14-15)**

*"The present study analyzes fire counts and smoke over Pantanal in 2020, comparing this particular year's data with those from the previous seventeen years (2003-2019)"*

**Q2. Lines 24-25** The nature of the burned areas in Pantanal was determinant to the intraseasonal variability of the smoke within the biome in 2020.

What does determinant mean here.

**R: The sentence was adjusted, as follow, to better express its meaning (See manuscript new clean version Lines 23-25).**

*"The observed intraseasonal variability of smoke over Pantanal revealed to be largely driven by the nature of the burned areas in the biome."*

**Q3. Line 37.** Its perturbation on the regional climate span from lowering the solar energy availability

**R: The sentence was adjusted to improve the summary of the ways through which the Regional Smoke Plume affects the South America regional climate. (See manuscript new clean version Lines 38-40)**

*“The RSP affects the regional climate reducing the availability of solar energy at the surface and perturbing the cloud microphysics and atmospheric thermodynamics and chemistry.”*

**Q4. Line 73.** South not southern Line

**R: southern was replaced by south (See manuscript new clean version Line 73)**

**Q5. Line 77.** Exposition

**R: “Exposition” word was excluded and the text adjusted including the expression “it is less affected by” (See manuscript new clean version Line 77)**

**Q6. Line 84** critics

**R: “critics” was excluded and the text was adjusted as follows “Large scale biomass burning within its domain and the RSP affect the local and regional climate equilibrium and also pose a direct threat to the health of Pantanal’s singular biodiversity and population.” (See manuscript new clean version Lines 83-85)**

**Q7. Line 85.** Pantanal to Pantanal’s

**R: “Pantanal” was replaced by “Pantanal’s” (See manuscript new clean version Line 85)**

**Q8. Lines 85-86.** For land use consideration of fire distribution across Pantanal during the 2020 burning season, highlighting conservation and indigenous areas, were used

**R: The sentence was adjusted (as can be seen below) to clarify its message. (See manuscript new clean version Lines 85-87)**

*“MODIS (Moderate Resolution Imaging Spectroradiometer) Enhanced Vegetation Index (EVI, Kidan 2021) was applied in land use characterization across Pantanal during the 2020 burning season, specially to highlight conservation and indigenous areas, which tend to present higher biomass density.”*

**Q9. Line 106.** Extension or extent

**R: The term “distribution” was used instead of extension or extent, which is a much clearer term. (See manuscript new clean version Line 107)**

*“...to analyze the distribution of illegal biomass burning...”*

**Q10. Line 107-108.** The fire counts used, not the used fire counts

**R: "...the used fire counts..." replaced by "The fire counts used..." (See manuscript new clean version Lines 107-108)**

**Q11. Line 126.** South, not southern

**R: "southern" was replaced by "south" (See manuscript new clean version Line 126)**

**Q12. Line 132.** the regional plume influence dominium How about instead simply, the regional plume.

**R: "...the regional plume influence dominium." replaced by "the regional plume." (See manuscript new clean version Line 132)**

**Q13. Line 192-194** However, two interesting aspects worth emphasizing are that Pantanal, for October 2020, presented a much lower fire count compared to August and September, and higher smoke loading than Amazonia.

Confusing. Is the comparison between October and the previous months OR between Pantanal and Amazonia?

**R: The sentence was reviewed, as follows, and we hope that the explanation is much clearer now. (See manuscript new clean version Lines 190-194)**

*"Regarding the intraseasonal variability of smoke aerosol loading, October 2020 in Pantanal can be evaluated as exceptional when compared with October from the previous years of the time series here analyzed. An interesting aspect worth emphasizing for October 2020 is that Pantanal presented much lower fire counts compared to August and September (Figure 3). However, August's higher fire count in Pantanal did not translate into a high level of smoke over the wetland biome.*

**Q14. Line 261,** "about that" about what? What are the authors referring to?

**R: The sentence was modified (see below) in order to clarify what we would like to express. (See manuscript new clean version Lines 257-258)**

*"However, with the explosion of fire counts across Pantanal in 2020, there was a question about the role of Pantanal's smoke emissions to the RSP during the 2020 biomass burning season."*

**Q15. Line 277** revealed to be determinant to the amount It sounds less stilted to say "revealed to determine the amount"

**R: Suggestion accepted (See manuscript new clean version Lines 274-275)**

**Q16. Line 278** Fire counts instead of fire number

**R: Suggestion accepted (See manuscript new clean version Line 276)**

**Q17. Lines 297-298.** when one considers the climate projections of increasing the frequency of drought conditions and the role of an adequate governance

The use of the word governance is not common in this context and in prior uses. What are the authors trying to say? On one hand we need to consider the likelihood of increased drought, but what are we considering about governance? Are the authors trying to say that BECAUSE of the likelihood of more drought, policy makers will need to take measures to mitigate future scenarios similar to the one shown here in 2020. "Adequate governance" is ambiguous.

**R: We accepted the reviewer suggestion and adjusted the sentence in the manuscript as follows. (See manuscript new clean version Lines 294-295)**

*"Because of the likelihood of an increase in drought frequency and intensity, policy makers will need to take measures to mitigate future scenarios similar to the one shown here in 2020."*

**Q18. Lines 301-303.** Pantanal 2020 biomass burning season could be seen as an example of the worst scenarios combination, climate extreme related to a fire-prone environment (Marengo et al. 2021, Libonati et al., 2020) and an unfavorable governance (Vale et al., 2021).

This sentence has issues. THE Pantanal 2020 biomass burning season represents the worst combination of a climate extreme applied to a fire-prone environment, coupled with inadequately enforced environmental regulations.

It's that "governance" again. The word just doesn't make sense to a native American English speaker.

**R: The sentence was adjusted including the reviewer suggestion, and we expect that it is much clear now. (See manuscript new clean version Lines 298-301)**

*"...the Pantanal 2020 biomass burning season represents the worst combination of a climate extreme applied to a fire-prone environment, coupled with inadequately enforced environmental regulations (Marengo et al. 2021, Libonati et al., 2020, Vale et al., 2021)."*

**Q19. Lines 304 – 307.** Valet et al. (2021) pointed out a large reduction in environmental fines during the pandemic was identified, despite the observed increase in Amazonian deforestation, slashing of resources for environmental protection and climate actions in 306 recent years and approval of legislative acts aimed at deregulating and weakening environmental protection during the COVID- 19 pandemic.

Another sentence with an inability to properly express the points.

Valet et al., (2021) pointed out a large reduction in environmental fines during the pandemic. This was a decrease in fine enforcement, not a decrease in environmental violations, as there was an observed increase in Amazonian deforestation. The slashing of funding for environmental protection and climate actions during the pandemic years has compounded the environmental harm imposed by legislative acts aimed at degrading environmental protection.

**R: The sentence was adjusted (see below) considering the reviewer comments, and we expect that it is much clearer now. (See manuscript new clean version Lines 302-305)**

*“Vale et al. (2021) pointed out a large reduction in environmental fines during the pandemic. This was caused by a decrease in fine enforcement, not due to a decrease in environmental violations, as an increase in Amazonian deforestation was observed. The slashing of funding for environmental protection and climate actions during the pandemic years has compounded the environmental harm imposed by legislative acts aimed at degrading environmental protection.”*