

Interactive comment on “Changing patterns of fire occurrence in proximity to forest edges, roads and rivers between NW Amazonian countries” by Dolors Armenteras et al.

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This paper analysed the effects of proximity (of roads, rivers and forest edges) on the occurrence of fires. We understand that these three features are indicative of accessibility to forested areas by humans. The study was conducted on a scale which encompassed multiple countries; a novel and necessary attempt to investigate forest fire frequency in the understudied NW Amazonian region. It is an interesting topic, mainly relevant to the conservation of fragmented habitats, and to policy decisions regarding road network expansion. This paper can benefit from some significant editing which

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might improve understanding. We have made some suggestions on both major and minor corrections which we believe will benefit the authors. Overall, we found that the study was pertinent and that research questions were exceptionally well-addressed. The title is succinct. We did find a lack of consistency in terms throughout the document. This review was undertaken by a discussion group at the University of Edinburgh, and is organised by section of the document. Abstract: Minor comments: L17- It is not clear what Legal Amazonia is – is this referring to Amazônia Legal? Yes, Legal Amazonia is one of the terms used for referring to the political divisions of Brazil that belong to the Amazonia, we have however added Brazilian for clarification

L23- There is a missing capital letter for ‘we’, and a missing ‘s’ at the end of difference. Thank you for the comment, we will correct this. L24- There should be a comma after country. Thank you for the comment, we will correct this. L23,24- ‘peak fire’ is repeated a lot and this sentence could be reworded. Thank you for the comment, we will correct this.

L28- There is a missing capital letter for ‘amazonian’. Thank you for the comment, we will correct this.

-you could mention that the study is novel because the region hasn’t been explored yet.

Introduction: Minor comments: L36- “forest” should be “forests”. Thank you for the comment, we will correct this.

L37- “at what” should be “at which”. Thank you for the comment, we will correct this.

L39- “or grazing” seems unnecessary. We consider important to point out both land clearing and grazing that are two different processes.

L40- there are too many citations here, and they break up the flow of the paper. Using a maximum of 3 in-text citations per parentheses (i.e. one classic, two more recent/relevant) might help. We believe all of those are classical and should be kept,

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however we will remove a couple of them

L41- some commas are missing: a lot of long sentences are used here, which need to be broken up a little. Thank you for the comment, we will correct this.

L42- “forest related” should be “forest-related”, and “products has enhanced” should be “products have enhanced”. Thank you for the comment, we will correct this.

L43- awkwardly phrased sentence, and not sure of its meaning. Thank you for the comment, we will correct this.

L45- “in general terms” is too vague a term. Thank you for the comment, we will correct this.

L47- what is meant by “unusual”? i.e. is it more frequent? Not normal, not following the usual pattern. We believe the word expresses well what we want to communicate here.

L49- need to capitalise “oscillation”, and give the acronym “NAO” to be consistent with Thank you for the comment, we will correct this.

L48 “ENSO”. Thank you for the comment, we will correct this. L54- comma after “Amazon”. Thank you for the comment, we will correct this. L57- “loss of” is unnecessary here, as you are already talking about reductions. Thank you for the comment, we will correct this.

L60- comma needed after “fire patterns”, and “legal” should be capitalised to be consistent. Thank you for the comment, we will correct this.

L62- need to choose between “shorter” or “weaker”: one alludes to length of time, the other to the temperature or rainfall. Thank you for the comment, we will correct this.

L66- this sentence can be removed, it provides unnecessary repetition. Thank you for the comment, we believe it is necessary to emphasize the point

L68- “Armenteras and others, 2013” should be “Armenteras, et al., 2013”. Thank you

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for the comment, we will correct this.

L69- “climate change” is unclear, please clarify the meaning in this context or provide an example, e.g. under IPCC scenarios. Thank you for the comment, we believe it is not necessary to refer to the scenarios when talking about climate change in general

L72-73- awkward phrasing, could be changed to “Little is known about factors which influence fire dynamics and patterns in NW Amazonia, or about the links between fires and deforestation and fragmentation in ...”. Thank you for the comment, we will correct this.

L73- “NW” needs to be consistent: either use “NW” or “north western”.

We will keep NW

L74- “Ecuador” should be “Ecuadorian”. Remove “but see”. Corrected, thank you

L82- The types of forest fragmentations should be addressed in your methods. We are not sure about what this comments refers to, we are only using distance to edge as a proxy and we are not considering or analyzing types of fragmentation

Major comments: L58- information on why fires are important hasn't yet been given, and while we assume it is a human-related issue, this hasn't been clarified. This seems integral to the study, should be expanded upon. We will incorporate a sentence referring to types of fires that might help clarify this point.

L60-63- sentences on rainfall don't appear relevant to this study. If they are, relevance needs to be included and shown, otherwise they should be removed from the introduction. Furthermore, the removal/relocation of this section would allow for a smoother transition into the following paragraph; it is currently an awkward transition. We believe we cannot remove the importance of climate influencing fire patterns and believe is relevant to keep this.

L75-76- this sentence should be incorporated earlier on; it's particularly important in

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understanding why this study is being Thank you for the comment, we will correct this., where there is a gap in our knowledge.

We believe it flows better in this section.

Methods: Minor comments: L85- Unnecessary detail in site description– Figure 1 already includes study site coordinates. It is common to have this description accompanying the Figure

L88-89- A greater level of detail than required. We believe it is important to have the area explained to have a better reference of the territory in N and S analyzed.

L104- The section will benefit from a justification why was the data source chosen. The same applies for the use of the USGS HydroSheds data (L107). We will expand this and other data description L110- Clarify intra- and inter- for variability. Thank you for the comment, we will correct this.

L111- Clarification needed as to what type of data was used: individual year one or pooled for all years. We will expand this and other data description

L115- It was briefly mentioned in the Discussion section that river networks are investigated due to being transportation routes. It might be beneficial to include this justification or expand on it as part of the Methods section. As mentioned we have expanded the data description. Unfortunately, the data bases do not discriminate those that are transportation routes L123- Unnecessary information included in parenthesis. On the contrary, we believe is important to clarify L124- Avoid the use of words like “totally” and substitute for more quantitative terms. Thank you for the comment, we will correct this.

L126,131,132- CDF rather than CFD consistently used throughout section. Thank you for the comment, we will correct this.

Major comments: Not entirely convinced that 2010 forest/non-forest map used is adequate as rapid deforestation has occurred in the period investigated. This might shift

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the forest edges We have already discussed this, the higher resolution available of a forest map is 2010 and it matches the year of the road dataset. The edge of the forest is static reference point for sure, but is a proxy of the proximity of fires to forest.

Weather changes because of deforestation (wind speed and direction) might influence fire occurrence. Would it be possible to relate fire occurrence MODIS data to MODIS land use data? If not, it might be useful to discuss any limitations due to the data used in the Discussion section of the paper. Thank you for your comment. We agree with your comment but of course this is out of the scope because it includes a weather model. Regarding the land use could be an interesting approach we chose to focus on only one land cover which is forest, the complexity of different types of fires (i.e. Maintenance fires, (ii) Deforestation fires, and (iii) Forest fires.) and the link with land use will be the subject of a follow up study.

Results: Minor comments on figures: Figure 1 - consider adding colour, the study area and hotspots are difficult to differentiate as well as the country borders. If colour isn't an option consider using multiple figures. We have Thank you for the comment, we will correct this. so. L282- “.” after Figure 1. Thank you for the comment, we will correct this.

Figure 2 - more detail in the legend to define the key also you might consider using colour again here (it's difficult to differentiate between Venezuela and Colombia). There is also a cropping error on the x axis label and a missing bracket on the y axis label. Thank you for the comment, we will correct this.

Figure 2B could also probably be supplementary. We believe is an important figure to be kept

L285- add a space between “)(“. Thank you for the comment, we will correct this.

Figure 3 - again consider colour and you are missing brackets on the y axis label. Thank you for the comment, we will correct this.

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L286- elaborate on what you mean by “monthly average” i.e. over how many years? The 12 years of the study, for the period 2003-2015. Thank you for the comment, we will clarify this.

L287- add a space between “)(“ . Thank you for the comment, we will correct this.

Figure 4 5 - Add colour, it is very difficult to read your figures and the resolution of the text is blurry. Furthermore the font used for labeling figures A and B are different than the font used for figures C and D. You also mixed up CDF and CFD in the y-axis labels. Thank you for the comment, we will correct this.

Table 1 2 can both be moved to the appendix or supplementary information. All they are saying is that there is an association between fire and accessibility/forest edge compared to the null and since they all have the same p-value just quote that in the results section and write “see appendix” instead of keeping these tables.

Thank you for the comment, we will correct this.

Minor comments on text: L142- Reword ‘less fires’ – to perhaps the least, or fewer. Capital needed for “South” to be consistent. Thank you for the comment, we will correct this.

L144- capital for ‘north’. Thank you for the comment, we will correct this.

L145- capital for ‘south’. Thank you for the comment, we will correct this.

L146- when reporting an anova, you should give the number of degrees of freedom and the error of degrees of freedom as well. Thank you for the comment, we will correct this.

L151- reword ‘this is not surprising’. Thank you for the comment, we will correct this.

L153-155- the structure of this sentence could be improved. Is this sentence relevant to include in terms of the research questions you set out? Yes, we believe so L154- Missing capital for ‘southern’ Thank you for the comment, we will correct this.

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L157- Irrelevant information, as the legend tells us this information. However, tables should potentially be removed and put in supplementary information. Thank you for the comment, we will correct this. L159-161- This is all you need but could be expanded to summarise the information in the table – that all p-values <0.01 and refer to supplementary material. Thank you for the comment, we will correct this. L163- ‘On the other hand’ is not necessary. Removed L166- missing comma after Ecuador. Thank you for the comment, we will correct this. L167- ‘The case for roads’ is too conversational, similar with ‘it is really’ – re-wording is needed. This information might be more relevant for the discussion. Thank you for the comment, we will correct this.

L173- should say ‘see supplementary material’ instead. Thank you for the comment, we will correct this.

L178- ‘table 2’ not required if they are put in supplementary information. Thank you for the comment, we will correct this.

Discussion: Minor comments: L186- “indicated” should be “indicate”, and the present tense should be used through-out the discussion. Thank you for the comment, we will correct this. L189- Figure 1 is not entirely appropriate to support this information. Perhaps Figure 3a would be a more appropriate figure to reference at this point. Thank you for the comment, we will correct this.

L190- Consider adding more detail regarding what is meant by a “well-established” Feature We have will modify and remove the “feature”

L192- SST is not referred to previously. Thus there should be a full name for this in parentheses here. Thank you for the comment, we will correct this.

L194,197- Equator is not capitalized here but has been capitalized throughout the rest of the paper. Consider changing this for the sake of consistency. Thank you for the comment, we will correct this.

L199-211- This paragraph incorporates results not previously discussed in the results

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section. Results could be presented first in the results section and then discussed in more detail in the Discussion. This paragraph also does not aid in answering the key research goals of the study, and could therefore be condensed down to a few sentences that explain how extreme weather events could influence variation. This section is discussing Figure 2 and we believe is relevant for the goal of the study.

L210- “associated to the AMO” should be “associated with the AMO”. Thank you for the comment, we will correct this.

L210- Niña should be La Niña. Thank you for the comment, we will correct this.

L212- “influence of accessibility in fire occurrence” should be “influence of accessibility on fire occurrence”. Thank you for the comment, we will correct this.

L217- It is not necessary to have “However” and “Contrary to this study”, just one of these would suffice to start the sentence. In this case, we believe is necessary to keep both

L219- “we obtain this result also in Brazil” could be made to read better by altering it to “we also obtained this result in Brazil”. Thank you for the comment, we will correct this.

L239- Should the reference “Armenteras and others, 2013” not be “Armenteras et. al, 2013), all other papers are referred to this way. Thank you for the comment, we will correct this.

Major comments: -Perhaps touch on the limitations of the study and how these might impact on results. Expanding on the direction of future research could also be helpful. We believe the last sentence of the discussion heads in this direction

-The final sentence of the discussion touches on some really important issues, these should have been expanded on and should make up a much larger section of the discussion. We believe this opens future research needed but should not be expanded here

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-In general, replacing sections of the discussion that simply present results, with text explaining and expanding on the importance of these results would make for a far more interesting and informative discussion section

Thank you for your comments. We will make some minor changes yet we think that to recall part of the results help us discuss them in the context of the paper and is a good way to communicate the findings and implications to the readers

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