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Comment on nhess-2021-38

Anonymous Referee #1

Referee comment on "Impact of large wildfires on PM₁₀ levels and human mortality in Portugal" by Patricia Tarín-Carrasco et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-38-RC1>, 2021

General comments

This is an interesting and timely study. There has been a recent increase in studies linking health impacts from climate induced disasters and the manuscript touches on a highly relevant topic. However, I do have some questions about the data and the method, on which I have elaborated below.

Detailed comments

Why did the authors decide to use Global Forest Watch instead of, for example, CORINE?

Why did the authors select those four months? Would it have been an option to look at large events (>1000ha burnt) any time of the year? Can the authors explain this choice? Especially in light of air pollution (e.g., from PM) being worse in winter as air gets trapped under cloud cover (see for example Pey et al., 2010).

L.121: it may be helpful for the reader to refer to Fig 2 for a map of the locations of the monitoring stations.

L.121-125: could the authors expand on their method to correct PM10 data from wildfires from "normal" non-wildfire causes? I am a bit unclear as to what the authors mean by "background stations".

L.133. What is the impact of the uneven distribution of the background stations on the outcomes of the study? Especially since some of the NUTS-regions don't have any stations, while the urbanized NUTS regions have the highest number of stations but the lowest wildfire risk. Moreover, what did the authors do with the PM10 data in NUTS regions with more than 1 station? Did they average the PM10 values of all stations in one NUTS region?

L.140-142: I am unclear as to why a reduced number of deaths (over the selected time period?) prevented the authors from including a correlation for COPD and asthma. Then the authors would just find a smaller correlation between PM10 population from wildfires and these particular mortality causes? Can the authors elaborate?

L.145-147: if the authors use Pearson, then why explain Poisson as well? I found this a bit confusing. (Later, in section 3, I read that the authors use the Poisson for the RR. I recommend explaining this more carefully in section 2.3.)

L.154. From an earlier sentence (L. 111-113), I got the impression the authors only selected large fires in the time period of June-Sept, but from L.154 it appears that the authors correlated with both types of wildfire sizes (<1000ha and >1000ha). Maybe clarify this both in section 2.2.2 as well as in 2.3.2.

L.189-192: this paragraph seems out of place. I think it would fit better in the introduction, or – alternatively – link it better to the findings from Table 2.

Table 3: what is the difference between the 3 instances of columns headed with "All" and "Months w./LF"? From the text I gather it is the three types of death causes but it would be good to make that clear in the table.

Table 3 mentions 2016 population numbers while figure 2 shows 2011 population numbers. It would be good to match these. Also, were annual (monthly) mortality numbers corrected for annual population numbers? Would it be better to use mortality rates instead?

I think the paper could be restructured a bit by moving the content of section 3.1 up to section 2 (each of the different data sections). In my understanding, the sub-sections of 3.1 present (a discussion of) the input data while the actual analysis (and aim of the manuscript) of the relationship between wildfires and mortality are the core of the analysis and should indeed be presented in the results section.

L.261: how do the authors explain the lack of correlation between wildfires and PM10 for

these regions?

L.268: "in some areas": why only in some and not in others?

How do the findings compare to similar studies? How does the paper add to existing work such as the cited Faustini et al., (2015) paper?

In the conclusions, the authors remark that many other aspects could have influenced their findings, such as aged population, lower socio-economic status, etc. Why did they not correct their input data for this?

Minor comments:

- L13-14: "the 48% of wildfires occurred were large fires". This doesn't flow well, there appears to be a word missing.
- L16: "on the future" should be "in the future"
- 23: "an increase on" should be "an increase of"
- 26. I would replace "fustigated" with "hit" or something else. Fustigated is a bit lyrical in this context.
- 85 (and L.90): "is focused in" should be "focuses on"
- 94: the urbanized areas are depicted in red in Fig. 1, but it may be helpful to the reader to add the place names referred to in this sentence.
- 99: the use of "allied" and "verified" is incorrect in this sentence.
- 105-108: check referencing style and sentence structure
- 120: "network" is this a network of measuring points/stations?
- 128: this sentence seems to belong in the previous section on wildfire data?
- I think sentence L.169-170 and L.171-173 can be merged? Also, sentence L.171-173 doesn't read well.
- 189: check referencing style. When the authors say "area most affected" do they mean globally, or in Europe?
- 194: "unequal spatial" -> "unequally spatially"
- 195 "in the in" -> "in the"
- 203: "represented by black dots" -> dotted or shaded area
- 216: "cause death then" -> causes of deaths than
- 235 – 237: sentence doesn't read well.
- L 282 – 284: sentence doesn't read well.