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Title: Temporal variations and change of forest fire danger in Europe in 1960–2012
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Referee #2

We would like to thank the Referee for the constructive comments. The main changes based on the comments of Referees are: cross –correlations between FWI and burned area are now calculated also for Finland, sensitivity studies were taken out, thresholds for calculation of high fire danger days were changed and some of the figures were edited to be more informative and easier to read. We also have added a map depicting the trend of FWI in each grid box. As well, an error that made FWI values systematically too low was corrected. This correction has no impact on the conclusions of this study. Detailed replies to the comments are given in "Italics" after the comments given in the beginning of this document.

General comments:
This paper presents a descriptive approach to characterize temporal trends in fire danger in Europe. I find very interesting this study because not many studies are devoted to analyzing this topic and could be useful in forest fires management not only for the present but also for the future.

I suggest to publish in NHESS after you attend these comments.

Specific comments:
Some corrections and suggestions:
Introduction:
6292- P25 and 6293- P5: It would be interesting to check not only temperature or precipitation records but also their combined effects (drought conditions) since they are much more related to fire danger. Can you provide any reference related to this aspect?

Material and methods:

a) 6296- P5: You propose a regional division in Europe, in this sense you need to explain the division in four areas. What kind of criteria was used to define these regions?
b) 6296- P5: If you consider all Europe, not only the southern areas, it would be better to extend the fire season to other months different to March/September or June/September (national level in Spain, page 6297- p20), because forest fires in winter are not rare in other areas. I do not understand why you have used different analysis periods: only three months in the case of Spain, but six months (spring to summer) for the rest of areas. It is not explained in the text. Additionally, you have to remember that the FWI index is an accumulative index so you have to compute this index two months before the beginning of the considered period at least.
c) 6296- P5: You have to justify the 10 and 30 FWI threshold; otherwise other values could be equally useful. As you comment, FWI values larger than 30 are common in the southern areas, so higher values could be more representative of extreme situations in Mediterranean areas. At the same time, why have you used mean FWI instead of median or maximum, for example?
d) 6297- P5: More detail is necessary to understand the statistical tests used in this study; not all readers are familiar with the Mann-Kendall test or the Sen`s method.
e) 6297- P10: Other studies have used fire size or number or fires to explain fire danger in Europe, why didn´t you consider these types of variables?
f) 6297- P10: You have to explain why only fire occurrence in Greece and Spain were selected to analyze their relation with fire danger. These countries can be good examples of Mediterranean areas but they are not representative of the other European ecosystems. Therefore, if you have analyzed temporal trends in all Europe you should explore these trends in the rest of the areas.

Results:
6299- P5: According to table 1, the Mann-Kendall test for Western Europe has a 90% confidence level, not 95% as you commented in the text.
6299- p17: Correct a similar error in Table 2: for Northern Europe the confidence level is 90%, not 95%.
Discussion:
It was expected a more detailed discussion regarding the Spain case, compared to the thorough comments on the Greece`s results.
Other corrections:
6304-p20: Change "to the fact that form Spain.." for " to the fact that from Spain…"
6306-p5: Change "as long as the fie" for "as long as the fire".
6306-p10: Change "are burned…" for "area burned"
Figure 7: Change scale in the graphics, FWI or Precipitacion (-10 values) are not correct

Authors reply:

Below are our replies to the comments.

Material and Methods:

a) *Like in case of reply to Referee #1 the division is based on crude climate division. The southern region represents Mediterranean warm climate, the eastern region continental climate, the western area the more humid, Atlantic climate and the northern region the cool Fennoscandian climate. To illustrate detailed spatial variation of trend we have now added figures showing the trend in each pixel*
b) *A similar comment was also raised from the Referee#1. The index was calculated year round and then the values for each examined period were obtained. The cross-correlation between area burned and FWI has now been calculated the same way for all the three countries using the main fire season June-September values.*
c) *Like in the reply to Referee #1 the use of fixed thresholds is justified as the aim is to study the temporal variation. Moriondo et al. (2006) used value 45 for Mediterranean region. Lehtonen et al. (2013) selected limits based on Tanskanen et al. (2005) study and the limits were FWI>32 (extreme risk), 17-32 (high risk), 16-31) medium risk), <8 low risk. These limits were for boreal forest conditions. This is to indicate that the calculations can be done using various limits. We feel that when we examine temporal variation and change it is feasible to use the limits applied in this study. We have changed the limits to be 45 for Southern Europe and 20 for the rest of the Europe to make the analyses easier to compare with other research. We have added text that limit 45 was used only southern and the whole Europe. The use of maximum or mean would be possible, however, we have considered that the approach we have selected gives quite comprehensive view on the temporal variation of climate induced fire danger in Europe.*

References Moriondo, M., Good, P., Durao, R., Bindi, M., Giannakopoulos, C., and Corte-Real, J.: Potential impact of climate change on fire danger in the Mediterranean area. ClimRes., 31, 85-95, 2006.

Lehtonen, I., Ruostenoja, K., Venäläinen, A., and Gregow, H.: The projected 21st century forest fire risk in Finland under different greenhouse gas scenarios. Boreal Environ. Res., (in press), 2013.

Tanskanen, H., Venäläinen, A., Puttonen, P. and Granström, A.: Impact of stand structure on surface fire ignition potential in Picea abies and Pinus sylvestris forests in southern Finland. Can. J. For. Res,. 35, 410–420, 2005.

d) *This has been added*
e) *The use of number of fires in this kind of analyses is difficult because the way and accuracy to compile statistics on the number of fires varies from country to country and it may have also changed during the recent decades. The analysis based on burned can thus be considered more robust*
f) *See reply b)*

Results:

Both mistakes are corrected

Discussion:

After running again the new break points analysis we did not find any statistically significant breakpoints in the time series, therefore we revised completely this section to the new results.

Other corrections:

Corrections have been made