

Interactive comment on “Risk for large-scale fires in boreal forests of Finland under changing climate” by I. Lehtonen et al.

Anonymous Referee #2

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Projecting processes in future is a challenging issue for the scientists. Projecting fire risk is also very challenging. Additionally, it is a scientific research objective which has received recently quite a lot of interest. Especially for North Europe there are many studies with the same or similar research objective (projection of fire risk in general).

My main concerns with the manuscript are:

1. The fire data they use are limited to the period 1996-2014. I am wondering how safe is this limited period to project trends and patterns for the next 100 years in future. One of the authors leads a publication "Venäläinen, A., N. Korhonen, O. Hyvärinen, N. Koutsias, F. Xystrakis, I. R. Urbieto, and J. M. Moreno. 2014. Temporal variations and change in forest fire danger in Europe for 1960–2012. *Natural Hazards and Earth Sys-*

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tem Sciences 14:1477-1490." where a data period with fire observations from Finland from 1960 to 2012 has been used. Working with fire data series is evident that there are short periods with quite different patterns in the number and the size of the fires that are defined maybe from important/big socio-economic issues. This is also supported by the authors in the manuscript where on page 4755 line 9-10 they say " The steep decline in forest fires across Fennoscandia in the late 19th century has been attributed to the 10 cultural transition to modern agriculture and forestry (Wallenius, 2011)."

2. The authors support (page 4755 line 19-20) that forest fire risk is determined by weather/climate and fuel amount which is correct. My main issue now is that fuel amount and of course fuel characteristics have not been taken into consideration for the future projections. How safe is and how big can be the uncertainty/error to make the assumption that only weather/climate matters?

3. In the section 2.1 there is a confusion of the data used. I propose first to separate the two data sets and present them providing also some graphs. I am a bit skeptic with different sources especially for weather data the authors are using. In this section I was confused when going through. I believe that the text is a lot that instead of helping the reader creates difficulties.

4. The authors did not present in details the outputs from regression analysis especially as far as the output statistics so that the reader becomes familiar on how the regression models fit the data. I am especially interested to see the errors of the regression model, for example their distribution and maybe scatter plots between the variables so that to explore the patterns of the errors. Additionally, I find important here to speak about the size of their sample and if it is enough for their analysis.

5. On page 4764 line 13 the authors support that the fires in Finland distribute uniformly. I propose to use a index for this from point patten analysis like for instance Ripley k function or Nearest Neighbor. I see from the map than eventually the distribution of the fires is slightly clumped (out of the three random, uniform and clumped).

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The authors here need a statistic to characterize the distribution.

6. The text can be improved. I have a feeling that there is a tendency by the authors to write a lot; in some cases instead of being more informative the text creates difficulties.

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