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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Characterizing configurations of fire ignition points through spatiotemporal point processes" *by* C. Comas et al.

Anonymous Referee #2

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This paper presents and exploratory analysis of 984 fires recorded in a study area from Galicia, Spain over 2007–2011. The focus is on characterizing patterns in space-time, using a spatial-temporal version of Ripley's K function. They find evidence of short-term space-time clustering of ignitions. Their main conclusion is that fire risk that leads to conditions which are conducive to sustained ignition and spread of wildfires in this area occur in local neighbourhoods over short periods of time. This is a well-known property of wildfire ignitions, regardless of the region.

I have strong concerns with the relatively small size of this study area. The study area is small, only 30 km x 30 km. They discuss results up to spatial distances of 12 km. It

is my opinion that this study area may not be big enough to make conclusions at these distances (e.g., not that many non-overlapping discs/cylinders with 12 km diameters can be placed in this study region. And, this is the methodology that Ripley's K is based on. Hence, there is great uncertainty about results and strong concern about boundary effects when examining results at large spatial lags). The same issue occurs temporally. There are only 5 years of data. I question whether this is enough data to be confident about making conclusions about cyclic structures and the estimate temporal curve in Figure 2(c) is not strong exploratory work to support this conclusion. Besides, look at how variable the annual counts of ignitions are (Section 2.2 states there were "110 ignitions in 2007, 138 in 2008, 216 in 2009, 247 in 2010 and 273 in 2011"). If anything, these annually aggregated counts suggest counts of fires that there has been an increase, but obviously – because of how variable large-scale weather patterns can be from year to year – a much longer series of data is required before strong conclusions could be made about the significance of any possible trend over time.

I have also concerns about their methodology and the statistical write-up. For example,

- They state that they modified the bandwidth parameter "to avoid zero-intensity values". But, look at Figure 1's north-east quadrant: there is a large region there where there were no fires at all! There's no empirical reason to assume that this region should have a non-zero intensity here!

- The null hypothesis is the underlying point process is homogeneous. The same comment applies to K_st(u,v) = 2 pi u^2 v. This is the formula for the volume of a cylinder centered in a region of space and extending over time and the expected number of points from a homogenous Poisson process (not "inhomogeneous" as the authors incorrectly state) is related to this volume.

- 199 replicates is relatively small for the Monte Carlo based methodology that is employed. Using 500 or 1000 replicates would be more common and would lead to more

precise estimates of the percentiles of interest.

To conclude, I would prefer that the authors present a more thorough exploratory analysis of the data, without making strong conclusions (due to the limitations of their data set). What are the temporal trends in presence/absence of fires? What are the temporal trends in the counts of fires? What are the spatial patterns overall, and for each year? Why does that one region in the north-east appear to never have any fires? Are there “hot-spots” of activity each year? Or, does the short-term clustering appear to occur more randomly in space/time? And, does the ignition process appear to be separable in space time?

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 2891, 2014.