Answer to Anonymous Referee #1
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Comment 1

This mns presents a direct application of the spatiotemporal K-function to the analysis of the spatiotemporal structure of fire ignition points. The methodology is far from being new, and so the the added value of the paper is in the application.

ANSWER: The referee is right. Our main objective in this paper is to analyse the space-time configuration of ignition points. We analysed the space-time configuration of this point pattern to identify possible trends in the fire occurrence in this area and, as such, we were not interested in developing new statistical methods. The methodology considered in this paper is quite new and relevant. This has been initially developed by Gabriel and Diggle (2009) and later by Møller and Ghorbani (2012), and only one year ago this methodology has been adapted as a statistical packed in the `R` environment, the `stpp` package (Gabriel *et al.*, 2013).

Comment 2

Then, if we focus on the application, this seems to be just an statistical exercise run using some existing code. I am afraid that after reading the mns I can not find enough new ideas, concepts, or modelling strategies that make this mns a valuable contribution, not even in the field of the journal.

ANSWER: Our main aim has been to analyse the space-time structure of ignition fires in a wide region using a new methodology and to illustrate the use of this space-time methodology in a forest-fire context. To the best of our knowledge, this has been the first time this new methodology has been applied in such important context. Obviously, we have not tried to develop or derivate new statistical methods, but to apply the existing one to an important problem. We really believe that our paper can clearly illustrate the use of this new space-time methodology, otherwise a complex methodology, and help other researchers working in space-time earth phenomena to consider and use this new approach.

Comment 3

But the output of the simulations is written in terms of envelopes, and the authors might have considered adding more formal pvalues. Then, why limiting themselves to description of the Poisson structure and interactions.

ANSWER: The use of a Monte-Carlo test as a valid test of hypothesis is a quite standard practice in point process statistics (see, for instance, Diggle, 2003). In its original paper, Gabriel and Diggle (2009) also proposed a Monte Carlo test to discern between inhomogeneous Poisson point patterns and cluster or regular space-time structures. As suggested by the referee it would be possible to find other alternative methods of testing this hypothesis. However, this would imply the development of new statistical methods which is out of the scope of this paper. In any case, the use a Monte-

Carlo test ensures us a reliable method of testing space-time configurations, what is, finally, what we want in this work.

Comment 4

If the point pattern is not Poisson and shows spatiotemporal interactions, you should go ahead in finding a statistical model describing such structure. Then, based on a close mathematical model, you can provide predictions ahead in time or space.

ANSWER: This should be a second step in this analysis. However, this is clearly out of the scope of this paper, which was to analyse the space-time structure of ignition fires applying a quite specific methodology, but not to model such space-time configuration. A modelling process of space-time point pattern is *per se* a new important objective which should be considered in a new scientific work.

Comment 5

Another important fact here is the concept of separability. The authors are assuming separability between the spatial and temporal components of the intensity, but this should be tested in some way, and not taken as a pragmatic working assumption.

ANSWER: We agree with the referee that this is an important issue. However, the definition and the use of a test of separability for the space and the time domain it is a hard issue and it is still an open question (Moller and Gobarni, 2012). As such, this is again out of the scope of this paper. Moreover, the pragmatic assumption of separability between the space and the time domain for the estimation of the intensity function is useful and also it is the assumption under which is based the methodology of Gabriel and Diggle (2009). The `stpp R` packed provided by Gabriel *et al.*, (2013) is also based on the separability of the space and time domains.

Comment 6

Non-parametric estimation is a first step when no covariate info is available, but it is easy to think that both spatial and temporal covariate information is available nowadays.

ANSWER: As already explained, the use of covariates would be necessary when modelling the space-time configuration. For the pure analysis of the space-time point pattern it is enough the use only of the point pattern structure.

Comment 7

Finally, the authors shoud take into account an alternative way of modelling strategy, in this case more based on counts in small regions rather than locations. And make use of lattice data in space and time. A comparison of procedures is a good idea.

ANSWER: Our fire ignition dataset it is itself a point pattern, i.e. ignition fires are located in a continuous space-time domain. As such the use of a lattice approach (counts of points in small regions) would clearly simplify of our data. In fact, instead of having the exact location of each ignition fire we would have a pixel based structure of fires. The objective of this paper is to analyse the space-time structure of fire ignitions based on a point pattern, and to use, for this purpose, a new and relevant methodology. As such, we want and we need the point pattern.

Obviously, if the point pattern is simplified to a lattice structure we can use space-time tools related to lattice data, and it is perfectly reasonable to compare both approaches. However, this should be a completely new work, a new work where point process statistics are compared to lattice statistics.

References

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