



A Marked Spatio-Temporal Point Process Model for Forest Fires in Portugal

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Abstract. In Portugal, forest fires are a relevant public policy issue due to the significant economical and social damage they cause. It is very important to understand the patterns of forest fires in Portugal in order to improve the means of surveillance, fire fighting and fire prevention.

Forest fires can be seen as a random set of points falling in some space, each point represents the location, time and area burned of each fire. So, forest fires can be regarded as marked spatio-temporal point pattern and the aim of this work is to model the area burned (marks) given the locations of the forest fires (point process) ([3] e [1]).

The data set analyzed consist of satellite imagery records of forest fires larger than 35 hectares, observed in Portugal during the years 1975 through 2005, acquired annually after the end of the summer fire season. We model the location of forest fires in Portugal by a log-Gaussian Cox process ([4]) and we use this model to model the area burned. By this way we try to show how the point configuration affects the dimension of the fire.

We adopt a Bayesian inference framework and use the Integrated Nested Laplace Approximation (INLA) and Stochastic Partial Differential Equation (SPDE) to perform the inference ([5] and [2]). The implementation was made through R-INLA package.

Keywords. marked point patterns; log-Gaussian Cox processes.

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