

Abstract

Mapping Fire Ignition Probability through a Two-Level Approach in a Mediterranean Area: The Corse (France) Case Study [†]

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Abstract: Wildfire ignition patterns are a key factor in fire regimes and, thus, increasing knowledge about where and why wildfires occur is essential to implement more effective prevention strategies. Furthermore, spatial predictions of potential fire ignition patterns might help to better allocate the economic efforts for prevention and to develop wildfire policies. Despite this, few studies addressed ignition patterns within the analysis of fire regimes in detail. This is often due to the scarcity and coarse resolution of data, e.g., ignition causes aggregated by municipalities or provinces that prevent low-scale studies or management actions. In this work, we propose a two-level approach combining spatial coarse-scale models of fire causes with high-resolution ignition prediction maps to overcome the aforementioned limitations. In the framework of the Italy–France Marittimo MED-Star project, two datasets relating to Corse (France) were obtained and combined: (1) fire causes from Prométhée and (2) the spatial ignition points of Goliat database. The random forest algorithm was used for modelling the probability of fire causes based on socioeconomic and environmental factors (retrieved from Copernicus LMS and INSEE’s databases). Later, a recommendation system algorithm was applied to calibrate an ignition prediction model based on local conditions at a finer scale. Finally, both models were spatially projected over the territory and then, the probability of each cause (resampled at ~50 m) was multiplied by the ignition prediction map to obtain a high-resolution likelihood for each cause. This work aimed to be the first step to find which algorithms give better results in processing data on wildfire ignition points and causes, together with project fire ignition prediction maps. Results suggest that more extensive and detailed databases could improve result accuracy and that agencies’ data collection on fire ignition points and causes could lead to a better understanding of fire ignition patterns and their variety.

Keywords: wildfires; wildfire causes; ignitions; ignition pattern; wildfire risk



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