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Abstract

Wildfire Simulation Modeling to Analyze Wildfire Hazard and Exposure in the Italy–France Maritime Cooperation Area (Sardinia, Corsica, Tuscany, Liguria and Provence–Alpes–Côte d'Azur) †

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Abstract: In this work, we will present the transboundary wildfire simulation system used to analyze fine-scale (100-m resolution) wildfire hazard and exposure in the regions of the Italy–France Maritime cooperation area (Sardinia, Corsica, Tuscany, Liguria and Provence–Alpes–Côte d'Azur), which covers about 93,000 km^2 of land. The study area is characterized by a variety of ecological, cultural, anthropic and touristic values that are heavily threatened by wildfires, mostly during the summer season. The wildfire issues in the area are expected to worsen in future years due to a number of contributing factors, including climate change, the abandonment of agrosilvopastoral areas with the resulting increase in fuel load and continuity and the expansion of urban interfaces into fire-prone wildlands. To perform our analysis, among the large set of wildfire spread models available, in the framework of the MED-Star project, we have selected the Minimum Travel Time (MTT) algorithm of Finney (2002) as implemented in FConstMTT. As inputs for our simulations, we produced underlying fuel maps derived from regional land use and forest maps and focused on the historical moisture and weather conditions and patterns associated with the largest wildfires that affected the study area in the last 20 years. The simulation outputs allowed us to characterize spatial variations in wildfire spread and hazard among and within provinces and regions and to identify the most significant hot-spot areas. In addition, we combined the simulated raster data with several explanatory variables and spatial layers (e.g., wildland–anthropic interface maps; provinces; climatic zones; etc.) to characterize exposure levels at different levels. Findings from this work improve regional awareness and knowledge about the spatial dynamics and patterns of wildfire exposure and hazard in the Italy–France Maritime cooperation area.

Keywords: MTT algorithm; burn probability; fire risk; Mediterranean areas; fire spread models

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