Abstract

Assessing the Potential Impacts of the Vaia Storm on Wildfire Spread and Behavior in the Veneto Region †

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†   Presented at the Third International Conference on Fire Behavior and Risk, Sardinia, Italy, 3–6 May 2022.

Abstract: On 29 October 2018, the Vaia storm hit the Alpine forests of Italy with winds at 200 km h^{-1}. The forest areas totally or partially damaged by the storm were about 41,000 ha, of which about 12,000 ha were in the Veneto Region. Large areas and stands of spruce and beech forests, usually not very prone to wildfires, were blown down. Only limited portions of areas with downed trees were harvested in the first year after the storm. Due to the changes in surface fuel conditions, timber understory fuel models in the area affected by the storm were converted to slash-blowdown models, which results in significant short-term changes in potential wildfire behavior. To investigate how wildfire behavior and spread were affected by the above changes, we applied wildfire simulation modeling to assess the variations in wildfire exposure characteristics (such as burn probability and conditional flame length) before and after the storm in the three Veneto provinces (Belluno, Treviso, and Vicenza) where the blown down trees were concentrated. We simulated 50,000 fire events using the MTT algorithm as implemented in Randig, and considering the historical wildfire occurrence data in the study area. Regarding fuel input data for the simulations, we modified the existing fuel map (pre-storm) of the Veneto Region and modified the fuel models of the damaged forest areas considering different standard models of slash, according to the percentage of downed trees. The results highlighted spatial variation in wildfire exposure before and after the storm, with an overall increase of wildfire risk conditions in those areas characterized by both significant levels of blowdown and high historical likelihood of fire ignitions. The methodology proposed and the findings of this study can be useful to inform future wildfire risk and land management in the areas affected by the storm.

Keywords: slash fuels; wildfire exposure; MTT algorithm; alpine forests