



Abstract

# Smoke Emission from Burning Wood and Thermoplastic Decking Slabs with a Calorimeter Cone †

Bruno Martinent \*, Karina Meerpoel-Pietri, Paul-Antoine Santoni, Virginie Tihay-Felicelli and Toussaint Barboni

Equipe de Recherche sur les Feux, UMR CNRS 6134 SPE, 20250 Corte, France

\* Correspondence: martinent\_b@univ-corse.fr

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Wildfires are a major threat to the environment and human populations. Every year, 700,000 hectares of forest are burnt in Europe, and particularly in the Mediterranean area where Corsica is affected with its 550,000 hectares of forests. Among the threats induced by forest fires, the World Health Organization [1] showed that volatile pollutant particles cause at least 1.4% of deaths worldwide. The number of structures destroyed each year has been close to 3000 since the 2000s [2]. This increase in material damage observed is mainly due to the increase in the density of single-family dwellings on the outskirts of large cities. These situations force operational resources to prioritize the protection of people and property to the detriment of firefighting. Wildfires at Wildland Urban Interface (WUI) emit large quantities of smoke which are dangerous by their toxicity but also their opacity, which impairs vision [3]. Smoke emitted during forest fires is composed of a complex mixture of gases, volatile organic compounds (VOCs), and aerosols [4]. It is necessary to characterize smoke emission from all WUI elements in order to prevent inhalation of dangerous substance by near populations or firefighters [5].

The objective of the presented study was to improve the characterization of pollutants for two types of materials commonly used at outside of dwellings, i.e., wooden and thermoplastic decking slabs. Different radiant heat fluxes ranging from 10 to 50 kW/m<sup>2</sup> were imposed with a cone calorimeter. Gases, VOCs and aerosols were analysed for each phase of combustion. This study provides refined data on emission factors that can be used as input data in physical models (WFDS or Firestar) according to the combustion phases in order to evaluate the risk of toxicity and safety distance. The results showed that plastic slab emitted more smoke and less aerosols. Wooden slab released more VOCs.

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