

Wildfires: from risk to smoke, air quality and health impact

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FIGURE 1
Measuring firefighter's exposure to air pollution.

FIGURE 2
PM₁₀, CO and O₃ hourly simulated concentrations during the 2017 October wildfire events in the centre of Portugal.

Although wildfires already constitute a major problem for Portugal, climate changes project a warmer and dryer country that will increase the vulnerability of forests to wildfires. Additionally, wildfires have the potential to release significant amounts of atmospheric pollutants, which can severely impact air quality and human health. Providing information on the susceptibility of forest areas to wildfire risk, smoke and pollutant concentrations is crucial to safeguard the forest and the well-being of communities.

Over the years, the University of Aveiro has made notable scientific progress in assessing fire risk understanding fire and smoke behavior and its effects, through field measurements and modelling systems. Numerous sampling campaigns of wildfire smoke have been conducted under real conditions to improve emission inventories and source apportionment models, and also to measure short-term health effects of smoke on firefighters.

Additionally, an assessment of the (eco)toxicity of the particulate matter emitted has also been undertaken. Chemical transport models have been developed to properly simulate smoke and calculate air pollutant levels in the air.

Today, the University of Aveiro is successfully simulating fire risk and its propagation potential in present and future climate scenarios, smoke emissions, dispersion and chemistry to evaluate their impact on air quality and human health.

