

## Air quality during uncontrolled fires: a multi years case of study

G. Formenton<sup>1</sup>, A. Ragazzo<sup>1</sup>, V. Pengo<sup>1</sup>, G. Vedovato<sup>1</sup>, L. Zagolin<sup>2</sup>, E. Innocente<sup>3</sup>, M. Masiol<sup>3</sup>

<sup>1</sup>ARPAV (Environmental Protection Agency of Veneto Region), Dipartimento Regionale Laboratori, Mestre, Venice, 30171, Italy

<sup>2</sup>ARPAV (Environmental Protection Agency of Veneto Region), Unità organizzativa Qualità dell'Aria, Mestre, Venice, 30171, Italy

<sup>3</sup>Department of Environmental Sciences, Informatics and Statistics, University Ca' Foscari of Venice, Venice, 30123, Italy

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Presenting author email: elena.innocente@unive.it

Exposure to high level of pollutant as a consequence of uncontrolled fire is a issue that must be managed in the right way in order to protect environment and ensure a safe habitat for humans, flora and fauna, because is well know that emissions occurred during those events could serious contaminate air soil and water, and some pollutant could be hazardous for the human health (Lemieux, 2002).

During uncontrolled fires a lot of contaminants may be emitted, but in high concern for the human health are persistent organic pollutants (POPs) and PAHs (Coudon et al., 2019, Zhang et al., 2008). Moreover uncontrolled burning could release polychlorinated biphenyls dioxin-like (PCB dl), that are generated as by-product during industrial combustions.

Those pollutants are all of high concern for human health because they have well-known carcinogenic and mutagenic properties, e.g. is well known that PAHs is the main carcinogenic constituent of ambient aerosol (Zhang et al., 2008, Fent et al., 2018; Ravindra et al., 2008). Moreover, PCDD/PCDF, frequently referred as dioxin, are recognized as toxic chemical pollutant, with endocrine proprieties and toxic dioxin congener is classified as group1 carcinogen by the international agency for research in cancer (IARC).

The aim of this study is evaluate how uncontrolled fires can affect air quality by characterizing persistent organic pollutant emitted from some events occurred from 2015 to 2018 in Veneto region (northern Italy). This area is one of the most polluted and urbanized areas in Europe (Larsen et al., 2012) and uncontrolled fire can further enhance this severe situation, leading air pollution to critical level.

During those accidental events the Environmental Protection Agency of Veneto (ARPAV), in order to monitoring the effect of fires, and ensure public health, collected some air samples using Hi-vol samplers equipped with quartz fiber filter (QFF) for collecting "particulate" phase compounds and a polyurethane foam plug (PUF) for retaining "gas-phase" compounds. Subsequently, polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/PCDF), polychlorinated biphenyls dioxin-like (PCB dl) and Polycyclic aromatic hydrocarbons (PAHs), were analysed using a High Resolution Gas Chromatography (HRGC), coupled with High Resolution Mass Spectrometry (HRMS).

As expected results show large increase of PCDD/PCDF, PCB dl and PAHs during and immediately after incidental fires, with differences in pollutant composition.

It's noticeable how, in a few time (hours to days) pollutant concentration presented a clear and strong drop, leading air quality to better conditions. This drop is probably due to meteorological factors, that will be investigated.

Table 1. example of drop of pollutant in following days or hours after uncontrolled burning. PCDD/PCDF AND PCB dl are expressed in fg/m<sup>3</sup>, Σ PAH in ng/m<sup>3</sup>

date	PCDD/PCDF TEQ	PCB TEQ	Σ PAH
17/04/2015	35134.81	2483.82	1152.28
17/04/2015	209.52	53.99	36.08
18/04/2015	-	-	27.35

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