# DO THE WASTE FIRES INCREASES EXPOSURE TO CANCEROGENIC SUBSTANCES? AN EXAMPLE OF HYSPLIT MODELLING OF DISPERSION FROM 300 MG MUNICIPAL WASTE FIRE

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**Abstract**
The intensity of waste fires creates need of development of procedures of quick evaluation of threats, to be used during rescue. The plume dispersion is one of the fastest environmental threats. The previous research shows that waste fires are commonly located in the residential areas1. The environmental effects of fire have to be based on the real data and information from the rescue site, e.g., about:

- meteorology
- burned material
- land cover and topography

The work focuses on 23 organic and inorganic substances for which emission factors are known[2–6] and its concentration reference levels are defined[7], i.e.: Acetaldehyde, Acetone, Acrolein, Benzene, Benzo[a]pyrene, Bis(2-ethylhexyl) phthalate, Chlorophenol, Clorobenzene, CO, Cresol, Di-n-butylphthalate, Ethylbenzene, Fluorine, Formaldehyde, HCl, Methylenechloride, NOx, Phenol, $PM_{10}$, $SO_2$, Styrene, Toluene, Xylene. Using the HYSPLIT the atmospheric dispersion of pollutants was determined8. Then, using QGIS maps of average 1-hour concentrations in the 24 hours following the fire beginning were analyzed.

The highest concentration of benzo(a)pyrene was observed at 230 m away from fire location and was 10000% of the reference level (Figure 1). The influence on cancerogenic risk[9] of this fire is limited – the area where the reference value was exceeded up to 18 hours is 5 ha, up to 12 hours is 95 ha, and up to 6 hours is 400 ha (Figure 2).



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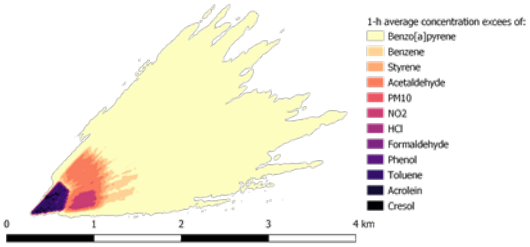


Figure 1. 1-h average concentrations of substances emitted in waste fire.

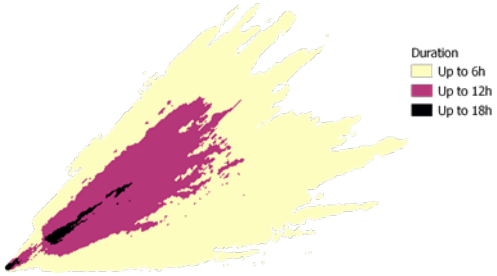


Figure 2. Duration of exposure for benzo(a)pyrene.

**Keywords:** waste fires, environmental impact assessment, cancerogenic risk, atmospheric dispersion

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