

Persistence of wildfire-derived pollutants in indoor environments

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The 2016 wildfire in Fort McMurray forced the evacuation of all 88 000 residents, and destroyed 15 % of the town's built structures. Re-entry was delayed after initial tests revealed elevated concentrations of the toxic elements Cr, As, and Sb in fire ashes. No studies exist so far that investigate if and how long wild-fire derived pollutants are retained in indoor environments and pose a long-term health risk to residents. We report initial results from a house dust sampling campaign carried out 14 months after the fire. We compare dust samples from 62 houses to urban and forest-floor ash collected during the Fort McMurray wildfire, background studies [1,2], and regulatory guidelines (Alberta Tier 1 guideline for residential soils).

Concentrations of Cr, As, and Sb in Fort McMurray (geom. mean 45, 4.2, and 6.5 ppm) were comparable to those in background studies (geom. mean 101, 7.7, and 5.5 ppm [1,2]). Our dataset, however, showed a higher variability of Sb concentrations, such that the most polluted houses of our study (95%-percentile: 46 ppm) exhibited significantly higher concentrations than in the background study [1] (15 ppm). Pollutant concentrations in ash samples differed between urban and rural areas. Urban areas exhibited high concentrations (200-3000, 100-1300, and 20-300 ppm; n=3) that exceeded regulatory guidelines (64, 17, and 20 ppm), while concentrations in forest-floor ash samples were typically below those found in house dust samples (7-300, 1-12, and 0.1-3 ppm; n=5).

Overall, our results indicate that very high concentrations of Cr, As, and Sb can be found in ashes from urban, but not rural, areas; however, our data do not provide evidence that these elements persist in house dust over extended periods of time.

[1] Rasmussen et al. (2001): *Sci. Total Environ.*, 267(1-3), 125-140

[2] Rasmussen et al. (2013): *Sci. Total Environ.*, 443, 520-529