

Pollution across an urban-alpine boundary: polycyclic aromatic hydrocarbons in the snowpack of Utah's Wasatch Mountains

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Polycyclic aromatic hydrocarbons (PAHs) are organic contaminants produced primarily through hydrocarbon combustion and petroleum processing and are associated with traffic, industry, and human population in general. Salt Lake City, Utah is relatively unique in its geographical position as a major urban center located directly adjacent to an alpine wilderness. Despite the protected status of this wilderness, airborne contaminants like PAHs are readily transported through the atmosphere and the PAHs produced in SLC may penetrate these alpine areas. The impacts of alpine topography on the transport of PAHs from urban-sources to alpine-sinks has received little attention, and PAHs have never been measured in the Wasatch Mountains east of SLC. In late winter of 2020, snowpack samples at six sites along an urban-wilderness transect from the west-face of the Wasatch Front near SLC into the Lone Peak Wilderness Area. Thirteen PAH compounds were measured in these snow samples with 7 PAH compounds exceeding method detection limits. When accounting for snowpack depth at each site, PAH concentrations declined rapidly across the urban-wilderness boundary, with greater penetration of low-molecular weight PAHs into the alpine wilderness. PAH concentrations in snow ranged from 0.5 ng cm⁻¹ in the wilderness area to 2.5 ng cm⁻¹ at the site nearest SLC. These are, to the best of our knowledge, the first measurements of PAHs in the wilderness areas of the Wasatch Front and are an important first step in investigating the transport behavior of PAHs in an alpine wilderness.