

4.202 Impacts on PM and O₃ in urban areas of the Western U.S. due to wildfires.

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Abstract:

Over the last several decades wildfires in the western U.S. have increased in size due to climate and other human factors. As a result, PM concentrations have increased significantly in large parts of the western U.S. While exceedances of both the particulate matter (PM) and ozone standards can occur due to smoke, it is much harder to identify and quantify the contributions to ozone. While PM is nearly always present in downwind fire plumes, it is also ubiquitous in urban areas from normal industrial sources. So separating out the effects of smoke PM from normal urban PM can be challenging at relatively low concentrations. At present we have a few tools to identify the presence of smoke in urban areas including in-situ PM measurements, enhancement ratios, models and the satellite derived HMS smoke product. We have also developed tools to identify the impacts from wildfires on O₃ in urban areas, including enhancement ratios and statistical modeling. Combined, these tools can provide ways to quantify the contributions of wildfire smoke to urban photochemical production of O₃. Impacts on O₃ in urban areas appears to be greatest during periods of light to moderate smoke (between 15-60 ug/m³) and fall off at higher concentrations. Because identification of smoke in urban areas is challenging at low to moderate concentrations, new tools are needed to identify smoke contributions in urban areas. I will discuss the use of other tracers, particularly some that could be routinely measured to indicate the presence of smoke in urban areas.